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FUNDACION TECNALIA RESEARCH & INNOVATION

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€ 6,766,313.00

48 months

16 partners

From 10 countries

Complete Li supply chain

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#LiCORNE EU project

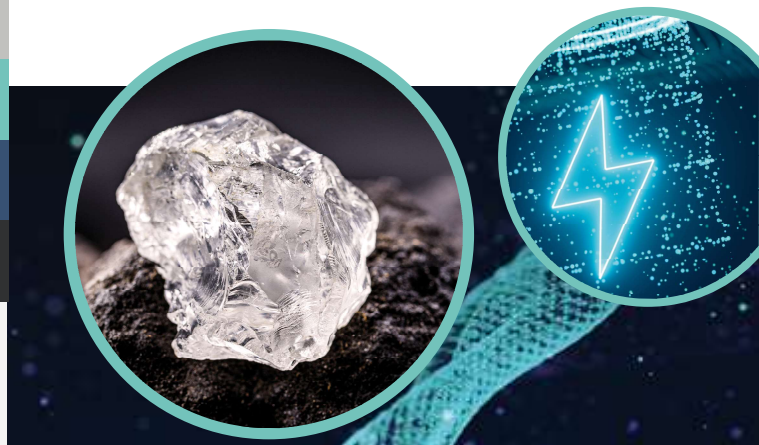
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LiCORNE

Lithium recovery and battery-grade materials production from European resources



Building up strategic reserves of Lithium to ensure the green and digital transformation of the European economy

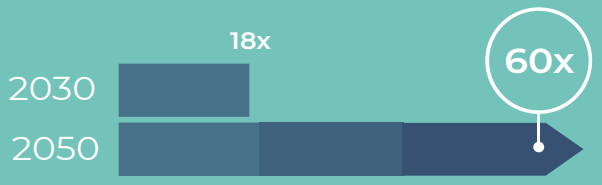
CONTEXT

The Urgent Need for Battery Materials in Europe

Surging battery demand, mainly driven by the electrification of the transport sector, has boosted over the past years the request for key metals used in their production. Compared to the current supply, the new EU regulatory framework for batteries Setting sustainability requirement (European Parliament 2021) estimated the production of LIBs will increase the demand for Lithium (Li) up to 18 times by 2030, and nearly 60 times more by 2050. This so-called new industrial revolution raises concerns around the tightening supply of raw materials, in particular Li.

Significant ore resources of Li (mainly pegmatite) and large reserves of geothermal Li deposits were identified in Europe. Additional to ores and geothermal reserves, it is expected that a significant quantity of Li, Co and Ni will be recycled from secondary resources such as the waste of the cathode production processes – also known as *off specification cathode waste material*.

Due to Europe's concern for ecological risks, Li production in Europe has been subject to high environmental standards, resulting in much smaller carbon footprint than imported supplies. Imminent harvesting of primary and secondary domestic resources of Li requires gaining the trust of the European citizens and policy makers in researchers' capacity to develop environmentally friendly production methods.



Expected demand for Lithium (Li)

OBJECTIVES

Developing more sustainable ways to produce Lithium in Europe

The LiCORNE project aims to establish the **first ever Li supply chain in Europe**, increasing the European Li processing and refining capacity for producing battery-grade chemicals from ores, geothermal and continental brines, tailings and off-specification cathode materials (waste).

This target will be reached through the following specific objectives.

Develop technologies at TRL4:

- **Beneficiation** technologies to increase Li concentration in pegmatites ore aiming to prevent 15% gangue entering downstream processes.
- **Physico-chemical transformation of Li-pegmatite concentrates** with non-acidic and low temperature process (~200°C) to facilitate downstream processes.
- **Efficient extraction of Li** contained in pegmatites concentrate and Li, Co and Ni from cathode waste, targeting 90-95% Li extraction while eliminating high-energy process such as calcination and sulfuric acid use.
- **Separation and purification** of Li from leachates and brines, targeting 94-99% Li selectivity depending on feedstock
- **Recovery of Li** as battery-grade chemicals Li_2CO_3 or $LiOH{\cdot}H2O$ targeting minimum 99% purity

Benchmark the investigated technologies and upscale the most promising one to TRL 5 - production of ~1 kg of battery-grade Li chemical (i.e., $LiOH{\cdot}H_2O$, Li_2CO_3 or Li-metal)

Communicate about the project's activities in an effective way.
Disseminate and exploit the project's results.

IMPACT

Building up the competitive production of Li from European resources

LiCORNE will allow European Li to be mined, processed, and refined in the EU at a competitive cost and environmentally friendly way, and in the vicinity of gigafactories, securing therefore materials supply and reducing significantly the cost of transport and associated GHG emissions.

EXPECTED MID-TERM OUTCOMES

Process development and validation on a wide range of feedstock to demonstrate the robustness and flexibility of innovative technologies, that are equally safe and cost-effective

Reduced GHG emissions, increased energy efficiency, and more efficient resource use and yield

Establishment of a unique platform built on combined knowledge and resources to produce battery-grade materials (LiOH, Li_2CO_3 or Li-metal) from European sources

New business opportunities and models for the European industry, creating additional jobs from increased processing and refining capacity

EXPECTED LONG-TERM OUTCOMES

Increased competitiveness of the European battery ecosystem through generated knowledge and leading-edge techs.

Accelerated growth of innovative, competitive and sustainable battery manufacturing industry in Europe

Increased overall sustainability and improved LCA of each segment of the battery value chain

Development and establishment of innovative recycling network and technologies in line with the European Circular Economy Action Plan (March 2020)