Near-zero-waste recycling of low-grade sulphidic mining waste for critical-metal, mineral and construction raw-material production in a circular economy

NEMO

https://h2020-nemo.eu/

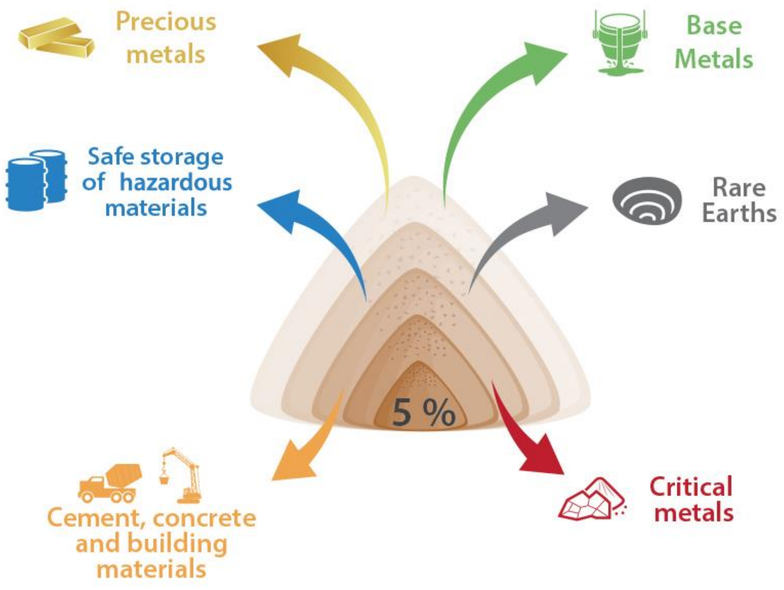
The NEMO Project

EU H2020 Innovation Action (SC5-14b) (TRL 5-8) with demonstration of the Near-zero-waste processing of sulphidic ores and waste.

Aim: **95% waste reduction in metal production flowsheets from sulphidic ores**.

⇒ Recovery of valuable and critical metals

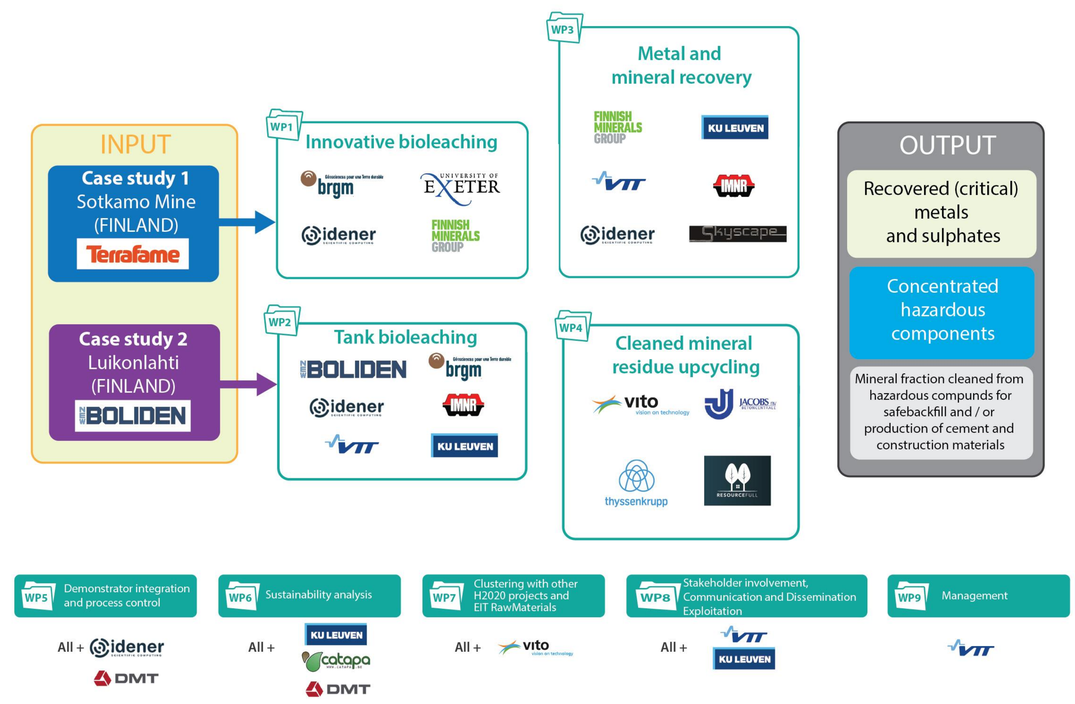
⇒ Cleaning the residual mineral matrix aiming for its valorization as cement, concrete and construction products or for safe final storage.



Sulphidic mining waste?

- Residues from mining and processing of sulphidic ores for the production of Cu, Pb, Zn, Ni, Co, Au.
- Considered as one of the largest volumes of extractive waste in the EU: approx. 600 to 900 Mtonne produced in EU per year + historic stockpile 28 000 Mtonne.
- Deposited in tailings storage facilities/dry stacked/back-filled in mine.
- Represents a new stock of (critical) metals and minerals.
- When poorly managed (e.g. historical waste), sulphidic mining waste may cause environmental problems (e.g. acid mine drainage) or pose risk for accidents (dam failure). These bad practice examples jeopardize the 'social license to operate' for mining.

Concept



NEMO develops, demonstrates and exploits new ways to valorise sulphidic tailings using a '**4 PILOTS – 2 case-studies'** approach:

The **4 PILOTS** are located at key points in the near-zero-waste flowsheet. The aim is to demonstrate innovative bioleaching processes to recover additional metals from sulphidic ores/residues and to maximize conversion of sulphides to sulphates, hereby eliminating the risk for acid mine drainage posed by the residues. Through enhanced leaching of the ores/waste, it is also aimed to "clean" the residual matrix allowing its use in cement and construction applications.

The **two cases** are the Terrafame Co-Ni-Cu-Zn mine in Sotkamo (Finland) and the Cu-Zn-Au Luikonlahti processing facility (Finland).
For the Sotkamo case, recovery of Zn, Ni, Co & Cu is improved, while additional metals such as REE, Sc, Mn, Mg, Al and Fe are recovered. For the Luikonlahti case, recovery of Co and Ni is aimed for.

Case studies

Terrafame mine
Co-Ni-Cu-Zn-mine
in Sotkamo (Finland)

Luikonlahti Cu-Zn-Au
processing facility
(Finland)

Civil Society Engagement

A special emphasis is placed on the so-called 'Social License to Operate' through the involvement of local actors to have an enhanced dialogue with the industry. An international high-level multi-stakeholder expert panel discusses lessons learned and develops policy recommendations.

Consortium

VTT, vito, idener, KU LEUVEN, Finnish Minerals Group, thyssenkrupp, Resourcefull, brgm, Skyscape, Jacobs, Boliden, IMNR, catapa, University of Exeter, DMT

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