

# START: SUSTAINABLE ENERGY HARVESTING SYSTEMS BASED ON INNOVATIVE MINE WASTE RECYCLING

## PRIMARY OBJECTIVE

To build an innovation ecosystem in the European Union (EU) related to the development of sustainable and economically viable tellurium-free thermoelectric (TE) waste heat harvesting systems, to be applied in heavy industry, maritime industry and also as primary power source for off-grid sensors and IoT devices.

## HOW WILL IT BE ACHIEVED?

By incorporating sulphides (mainly tetrahedrite mineral series), at present an environment hazard in mine tailings, collected in five European countries, in the production of advanced sulphide p-type TE thermoelements. In contrast, current commercial TE devices incorporate p-type and n-type TE thermoelements that are produced from expensive and rare elements, namely tellurium, which is predominantly sourced in China.

## EXPECTED IMPACT

The impact of START project's approach on endorsing a more sustainable and resilient EU comes from three inputs.

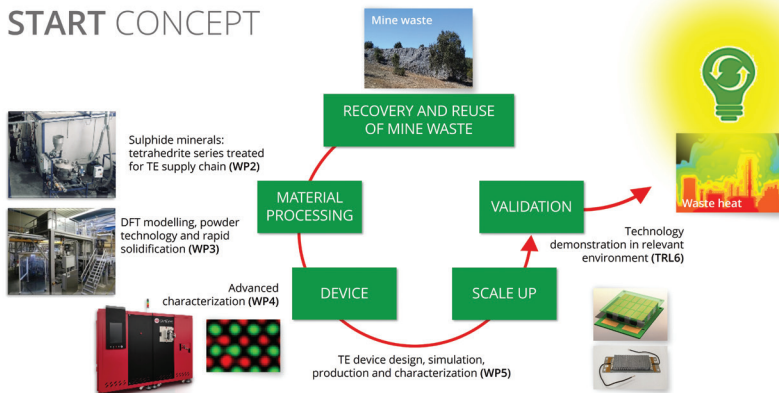
First, by reducing EU's dependence on primary critical raw materials.

Secondly, through the promotion of circular economy processes that will create value in EU by building a strategic ecosystem based on a high-abundant mineral.

Thirdly, by the production of TE energy harvesting systems offering a contribution to the reduction of fossil fuels consumption with a great impact on the increase of the overall efficiency of energy production and consumption systems, as well as on the reduction of the greenhouse gas emissions.

DURATION	01 June 2022 – 31 May 2026	BUDGET	9.2 M€
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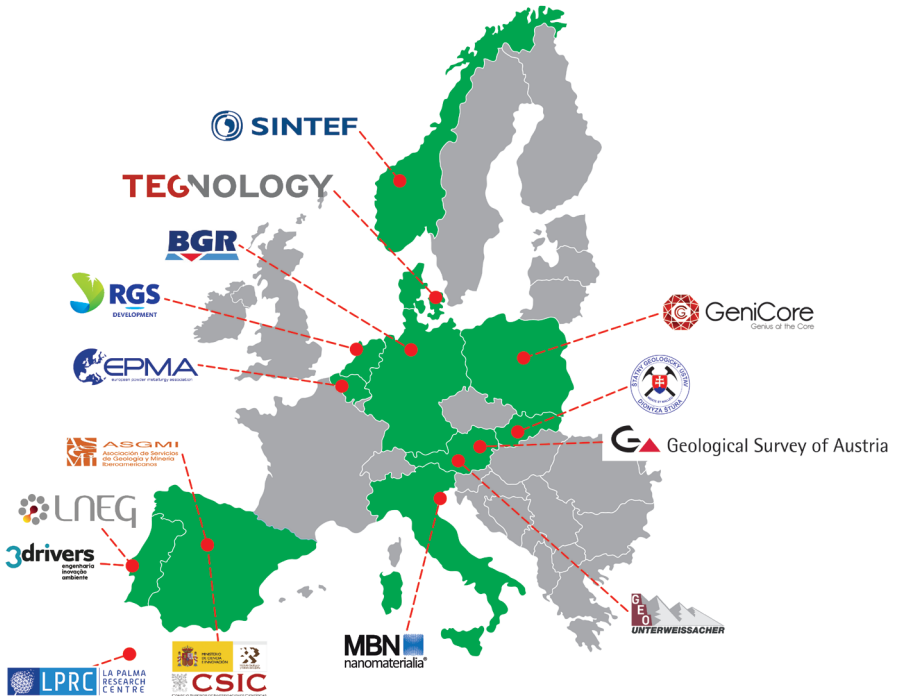
## START CONCEPT



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### THE START CONSORTIUM

The project is coordinated by LNEG (Portugal) and aggregates 15 organisations, from 10 EU member states and 1 associated country, including: 6 research organizations with strong background and knowledge on geology, materials science and renewable energies; 7 SME's companies that guarantee the entire supply chain, from production, exploitation and ecological footprint assessment; and 2 non-profit international associations with a consolidated network of partners and stakeholders.



[www.START-HEproject.com](http://www.START-HEproject.com)

