

Funding opportunities for geothermal projects

16.12.2022

HORIZON EUROPE

CALLS 2022

HORIZON-CL5-2023-D2-01-01: Technologies for sustainable, cost-efficient and low carbon footprint downstream processing & production of battery-grade materials (Batt4EU Partnership)

Model: single-stage

date:Opening: 13 Dec 2022 and **Deadline(s): 18 Apr 2023**

Budget: € 21 million, The Commission estimates that an EU contribution of between EUR 7 million would allow these outcomes to be addressed appropriately. **> 3 projects**

Call

Expected Outcome:

- A European economic base which is stronger, more resilient, competitive and fit for the green and digital transitions, by reducing strategic dependency on third countries for critical raw materials by promoting resource efficiency.
- Use of European post-mining (or **post-extraction, in the case of e.g. geothermal fluids**) primary materials and secondary material sources such as tailings (e.g., as a source of nickel, cobalt and lithium) or underutilised battery raw materials deposits and extend the local refining capacity of battery-grade materials, to reduce the dependency on imported materials and to limit supply risks.

Scope: improved battery metal and material production, refining and recovery while minimizing environmental impact of downstream processing

HORIZON-CL5-2024-D2-01-04: Emerging energy technologies for a climate neutral Europe

Model: single-stage

date: Opening: 07 Dec 2023 and **Deadline(s): 18 Apr 2024**

Budget: € 10 million, The Commission estimates that an EU contribution of between EUR 1.50 and 2.50 million would allow these outcomes to be addressed appropriately. > **5 projects**

Call

Expected Outcome:

Projects supported under this topic should consider at least one of the following areas:

- Energy distribution and transmission.
- **Long-term energy storage.**
- Novel energy generation/conversion methods.

The following areas should not be covered, as they fall within either partnerships or other calls:

- Renewable energy technologies covered under the call D3-1-49 on 'Next generation of renewable technologies) and renewable hydrogen production.
- Batteries and especially long-term electricity storage technologies, covered under D3-2-17 as well as flow batteries.
- Material research.

Activities are expected to achieve TRL 4 by the end of the project



HORIZON-CL5-2023-D3-01-01: Renewable Energy Valleys to increase energy security while accelerating the green transition in Europe

Model: single-stage

Date: Opening: 13 Dec 2022 and **Deadline(s): 30 Mar 2023**

Budget: € 40 million, The Commission estimates that an EU contribution of between EUR 20 million would allow these outcomes to be addressed appropriately.
> **2 projects**

[call](#)

Expected Outcome:

- **Contribute to the implementation of the REPowerEU Plan**, in particular to i) diversify gas supplies via higher levels of sustainable bio-methane (mainly based on organic waste and agricultural residues) and green hydrogen, and ii) speed up Europe's path to independence from fossil fuels by increasing the share of renewable energy (electricity, heat and fuels) in the European energy consumption
- Increase the roll-out of local or regional renewable energy system solutions for electricity, heat and fuel needs and contribute to their market up-take in Europe.
- Create new sustainable jobs linked to local or regional renewable energy system value chains and enhance economic growth in local or regional European communities.
- Enhance security and autonomy of local or regional energy supply in EU Member States/Associated countries in current and future climate conditions.
- Increase the readiness, reliability, performance and affordability of local or regional renewable energy system solutions in Europe.

Scope: Creation of a renewable energy valley 'living lab' in local, peri-urban or regional communities that demonstrates in real life conditions the sustainable and cost-effective production and storage of renewable energy from different local renewable energy sources providing multiple renewable energy carriers (e.g., electricity, heat, renewable fuels, bio-methane, biogas, hydrogen), fully covering the local energy needs on an annual basis.

Activities are expected to achieve **TRL 7-8** by the end of the project



HORIZON-CL5-2023-D3-01-14: Demonstration of innovative, large-scale, seasonal heat and/or cooling storage technologies for decarbonisation and security of supply

Model: single-stage

Date: Opening: 13 Dec 2022 and **Deadline(s): 30 Mar 2023**

Budget: € 30 million, The Commission estimates that an EU contribution of between EUR 10.00 million would allow these outcomes to be addressed appropriately. **> 3 projects**

[Call](#)

Expected Outcome:

Demonstration of innovative heat and/or cooling storage technologies, going beyond the state of the art, which address long-term energy storage up to cross-seasonal storage.

Large-scale solutions are expected to be embedded into

- **District-level heating and/or cooling storage.**
- and/or integrate heat supply (industry waste heat) and demand for **heat for industrial processes.**

Activities are expected to achieve TRL 7-8 by the end of the project

HORIZON-CL5-2023-D3-02-05: Advanced exploration technologies for geothermal resources in a wide range of geological settings

Model: single-stage

Date: Opening: 04 May 2023 and **Deadline(s): 05 Sep 2023**

Budget: € 8 million, The Commission estimates that an EU contribution of between EUR 4.00 million would allow these outcomes to be addressed appropriately. **> 2 projects**

[Call](#)

The projects will have to include:

1. The development and application of new tools and techniques for a wider range of geologically complex geothermal resources/reservoirs and
2. Coupled with innovative modelling and simulation techniques, increasing measurement precision and applying faster analysis of acquired data to achieve a feasible model of the reservoirs, and fracture systems and
3. The update and improvement of state-of-the-art geological reservoir characterisation and exploration techniques and methods to reduce the average cost for exploration. Such progress will be addressed in increasing detail the geological complexity of resources and increasing target depths.

Activities are expected to achieve **TRL 5** by the end of the project

HORIZON-CL5-2023-D3-02-06: Smart use of geothermal electricity and heating and cooling in the energy system

Model: single-stage

Date: Opening: 04 May 2023 and **Deadline(s): 05 Sep 2023**

Budget: € 15 million, The Commission estimates that an EU contribution of between EUR 5 million would allow these outcomes to be addressed appropriately. > **3 projects**

Call

Scope:

- Demonstrate the technical and economic feasibility of responding to commands from a grid or network operator, at any time, to increase or decrease output ramp up and down. - demonstrate the automatic generation control (load following / ride-through capabilities to grid specifications) and ancillary services of geothermal power plants. Address flexible heating and/or cooling supplied from binary cycles or EGS plants, including coupling with renewable energy sources.
- Increase variable demand of heating, cooling and electricity by integration of adequate installations and equipment such as heat pumps, energy piles, energy sheet pile walls, ORC turbo-expanders, heat exchanger networks, hot and cold reservoirs (e.g. geothermal storage, UTES).

Activities are expected to achieve **TRL 7** by the end of the project

HORIZON-CL5-2023-D3-03-01: Increasing the efficiency of innovative static energy conversion devices for electricity and heat/cold generation

Model: single-stage

Date: Opening: 04 May 2023 **Deadline(s): 10 Oct 2023**

Budget: € 9 million, The Commission estimates that an EU contribution of between EUR 3 million would allow these outcomes to be addressed appropriately. **> 3 projects**

[Call](#)

Expected Outcome:

The results are expected to contribute to at least three of the outcomes in A and B:

A. Increased potential for wider application of electricity and heat/cold static generators due to increased efficiency of energy conversion devices using physical effects such as:

- Thermoelectric -> Thermoelectric Generators (TEG)
- Thermovoltaic -> Thermovoltaic Generators (TVG)
- Thermionic -> Thermionic Generators (TIG)
- Pyroelectric-> Pyroelectric Generator (PEG)
- Electrocaloric -> Electrocaloric Generator

B. Optimised construction and application of the above-mentioned devices for:

- heat recovery applications with electricity generation;
- heat/cold generation from electricity;
- applications in areas such as industrial, automotive, solar, **geothermal**, data centres, buildings applications, etc.

Activities are expected to achieve TRL 5-6 by the end of the project



HORIZON-CL5-2024-D3-01-06: Innovative applications/integration of geothermal heating and cooling in industry

Model: single-stage

Date: Opening: 12 Sep 2023 and **Deadline(s): 16 Jan 2024**

Budget: € 9 million, The Commission estimates that an EU contribution of between EUR 3 million would allow these outcomes to be addressed appropriately. > **3 projects**

Call

Expected Outcome:

- High integration of geothermal heating and/or cooling in different industry sectors with operation flexibility considering start-up time and ramp-up rate, and maximum cascaded use of thermal energy.
- Increased industry, region, city and citizen trust and acceptability for geothermal energy.

Activities are expected to achieve TRL 5 by the end of the project

HORIZON-CL5-2024-D3-02-10: Market Uptake Measures of renewable energy systems

[Call](#)

Model: single-stage

Deadline date: Opening: 07 May 2024 **Deadline(s): 05 Sep 2024**

Budget: € 8 million, The Commission estimates that an EU contribution of between EUR 2 million would allow these outcomes to be addressed appropriately. **> 4 projects**

Expected Outcome:

- Facilitate the wider uptake of renewable energy systems (RES) in the energy, industrial and residential sectors leading to an increased share of renewable energy in the final energy consumption by 2030 and beyond.
- Contribute to provide open source validated tools and methodologies for policy makers and stakeholders for developing more informed RES policy and for analysing the market dynamics when including all renewable energies.
- Contribute to the development of markets and respective financial frameworks that can operate in an efficiently and incentive-compatible manner while accommodating massive shares of renewables.
- Improve social acceptability of renewable energy facilities and installations.

HORIZON-CL5-2023-D4-01-04: Thermal management and energy optimisation of high energy demand IT systems equipment in tertiary buildings

Model: single-stage

Deadline date: Opening: 13 Dec 2022 **Deadline(s): 20 Apr 2023**

Budget: € 6 million, The Commission estimates that an EU contribution of between EUR 3 million would allow these outcomes to be addressed appropriately. **> 2 projects**

[Call](#)

Expected Outcome:

- Better understanding of the challenges in thermal management of high-energy demand IT systems equipment in facility rooms inside tertiary buildings.
- Increased knowledge regarding solutions in the tertiary buildings case from transfer of relevant knowledge from other application field/sectors.
- Improved open access to the relevant and useful knowledge and information for the IT sector.
- Increased awareness of the most common specific use cases in tertiary buildings in EU Member States/Associated countries that could benefit from cost-effective and optimized thermal management and energy efficiency measures (solutions, practices, strategies, etc.), including solutions recovering and valorising of excess heat among others.
- Increased consensus amongst key actors regarding metrics, indicators, reporting, trends, monitoring and verification (M&V) schemes, methodologies & best practices to achieve best/optimal efficiencies through the design, commissioning, operation, management and decommissioning of IT systems equipment.
- Improved insight for future standardisation needs in relevant areas of influence (e.g. procurement, product design, manufacturing, services, cooling equipment, control equipment, buildings energy performance, operation, management, among others.) in order to facilitate further improvements and efficiencies in the relevant areas.

Activities are expected to achieve TRL 4-5 by the end of the project



HORIZON-CL5-2023-D4-01-05: Innovative solutions for cost-effective decarbonization of buildings through energy efficiency and electrification

Model: single-stage

Deadline date: Opening: 13 Dec 2022 **Deadline(s): 20 Apr 2023**

Budget: € 25 million, The Commission estimates that an EU contribution of between EUR 12.50 million would allow these outcomes to be addressed appropriately. **> 2 projects**

[Call](#)

Expected Outcome:

- Increased application of the energy efficiency first principle in construction and renovation of buildings.
- Increased decarbonisation of building thermal energy demand by means of electrification.
- Enhanced buildings energy performance and (smart) energy management, leading to increased use of locally generated renewable energy and local energy storage.
- Increased number of cost-effective and commercially available solutions for electrification of building thermal energy demand, with significantly lower costs per building unit and significant potential for mass roll-out in Europe.
- Enhanced building contribution to power grid stability by offering energy flexibility services.

Activities are expected to achieve TRL 6-8 by the end of the project

HORIZON-CL5-2023-D4-01-06: Integration of renewable heat or industrial waste heat in heat-to-cold conversion systems to generate cold for industrial processes

Model: single-stage

Deadline date: Opening: 13 Dec 2022 **Deadline(s): 20 Apr 2023**

Budget: € 20 million, The Commission estimates that an EU contribution of between EUR 10 million would allow these outcomes to be addressed appropriately. **> 2 projects**

[Call](#)

Expected Outcome:

- Integration of renewable thermal energy sources or industrial waste heat into more energy-, emissions-, cost- and space-efficient conversion systems generating cold for several industrial sectors and processes, maximising primary energy savings and CO2 emission reduction compared to present state-of-the-art, thereby reducing fossil fuel imports dependency.
- Optionally: integration of heat storage, of renewable electrical energy sources; integration of district heating or cooling network.
- Optionally: combined generation of heat and cold for industrial processes.

Activities are expected to achieve TRL 7 by the end of the project

HORIZON-CL5-2024-D4-01-03: Alternative heating systems for efficient, flexible and electrified heat generation in industry

Model: single-stage

Deadline date: Opening: 07 Dec 2023 **Deadline(s): 18 Apr 2024**

Budget: € 16 million, The Commission estimates that an EU contribution of between EUR 5.30 million would allow these outcomes to be addressed appropriately. **>3 projects**

[Call](#)

Expected Outcome:

- Take full advantage of alternative heating systems for electrified, efficient and precisely focussed heat generation in industry, that create the possibility for new, decarbonized and flexible processes, reducing fossil fuel imports dependency, maximising primary energy savings and CO2 emission reduction compared to present state-of-the-art, monstrated by LCA or similar studies (assuming decarbonised electricity use).
- Environmental and technical performances, health protection, safety and economic viability of novel heating technologies demonstrated and validated in industrial processes.
- Better awareness of the challenges and benefits of alternative heating systems in the relevant industrial sectors.

Activities are expected to achieve TRL 6-7 by the end of the project

Electrification of high temperature heating systems (Processes4Planet Partnership) (IA) - TOPIC ID: HORIZON-CL4-2023-TWIN-TRANSITION-01-33

Model: single-stage

Deadline date: Opening: 8 Dec 2022 **Deadline(s): 20 Apr 2023**

Budget: € 35.67 million, The Commission estimates that an EU contribution of between EUR 12-15 million would allow these outcomes to be addressed appropriately.
> 3 projects

Call

Projects are expected to contribute to the following outcomes:

- Demonstrate the use of advanced electric heating technologies for high temperature demand systems in the process industry;
- Prove the effectiveness of the technologies towards GHG emission avoidance;
- Reduce process emissions of high temperature heating systems by at least 30% compared to current state of the art levels of the process with fossil-based heating system;
- Enable the integration of renewable electricity in the process industries to substitute fossil fuels for heating, thereby contributing to the independence from fossil fuel and fossil fuel imports as put forward in the REPowerEU Plan[1];
- Showcase the scalability and the cost efficiency of the proposed solutions;
- Enable the economic viability of the entire unit to compete with the existing state of the art of fossil-based heating systems and increase of the competitiveness and resilience of the European process industry.

Scope:

High temperature (over 400 °C) industrial heating systems, powered by fossil fuel combustion, are responsible for 20% of process industries GHG emissions. The topic focuses on the sustainable electrification of high temperature heating systems, for example, industrial furnaces, kilns and crackers among others. Electrification of these heating systems with renewable electricity could represent a major reduction of the related GHG emissions.

Activities are expected to start at TRL 5 and achieve TRL 7 by the end of the project

