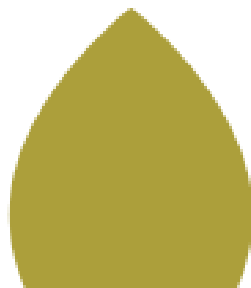


Technological Centre

Capabilities Horizon Europe

HORIZON-CL HORIZON-CL5-2023



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

TOPIC DEADLINE 20/04/2023	BUDGET PER PROJECT 2 M€	TOTAL BUDGET 21 M€	EXPECTED NUMBER OF PROJECTS 3	TYPE OF ACTION RIA
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Strategies for the valorisation of the generated waste materials during the refining processes by: improving the reuse of waste where CRM are present

Technologies for extraction and purification by selective means of CRM present in waste streams. The available technologies in CETIM comprise a wide range of potential waste streams that could include:

- Manufacturing solid industrial losses where CRM are present: hydrometallurgical bioleaching (via bacteria and or fungi) of key metals (including CRM) for battery manufacturing (Co, Li, Ni, Mn, among others).
- Recovery of resources from industrial water streams via biotechnology or alternatively, via physicochemical separation techniques:
 - Electrochemical separation.
 - Membrane filtration.

Assessment of recycling concepts, chemicals and materials under the Safe and Sustainable by Design framework

- Implementation of eco-design and Safe & Sustainable-by-design strategies to materials, chemicals, and processes. Health, Safety and Risk assessment of novel processes and materials.
- Sustainability Assessment of processes and products comprising the three pillars involved (environmental, economic, and social); Life Cycle Assessment (LCA), Life Cycle Costing Assessment (LCC) and Social Life Cycle Assessment.

CETIM has developed technologies for CRM materials recovery by the use of bacteria and fungi coordinating the project BIORECOVER and in other initiatives like the project BIOMAT RECOVER. Regarding electrochemical technologies, CETIM is providing these technologies in the project REWAISE. CETIM technologies will be applied in the recovery of materials from automotive sector in RELOAD.

HORIZON-CL5-2023-D2-01-02 New processes for upcoming recycling feeds (RIA)

TOPIC DEADLINE 20/04/2023	BUDGET PER PROJECT 2 M€	TOTAL BUDGET 15 M€	EXPECTED NUMBER OF PROJECTS 3	TYPE OF ACTION RIA
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Selective material recovery technologies

Biotechnological process for selective recovery and mobilization of metals and salts.

Selective electrochemical recovery of Li, Co, Mn, Ni and other relevant metals.

Processing of waste waters

Technologies (electrochemistry, membranes, etc.) for waste water treatment and recovery of solutes (Li, Co, Ni, Mn etc.).

Assessment of recycling concepts, chemicals and materials under the Safe and Sustainable by Design framework

- Implementation of eco-design and Safe & Sustainable-by-design strategies to materials, chemicals, and processes. Health, Safety and Risk assessment of novel processes and materials.
- Sustainability Assessment of processes and products comprising the three pillars involved (environmental, economic, and social); Life Cycle Assessment (LCA), Life Cycle Costing Assessment (LCC) and Social Life Cycle Assessment.

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HORIZON-CL5-2023-D2-01-03 Advanced digital twins for battery cell production lines (RIA)

TOPIC DEADLINE	BUDGET PER PROJECT	TOTAL BUDGET	EXPECTED NUMBER OF PROJECTS	TYPE OF ACTION
20/04/2023	2 M€	14 M€	2	RIA

Digital twins of battery cell manufacturing plants at pilot scale line level that incorporate appropriate models but also their connection to real manufacturing plants, e.g. to support process development and operation.

Digital twins representing the production scaling in order to simulate and calculate the optimal production line based on economical, safety, and custom parameters.

Design robust digital tools integrating multi-physics, data-driven models and hybrid modelling.

Developing Artificial Intelligence models to optimize the quality grade of the products/subproducts in several phases of the battery production line as the mixing or the drying processes.

Verify the transferability from pilot to production plant level.

CETIM has experience in developing Digital twins for pilot plant battery manufacturing systems – see GIGAGREEN HE project-

Aspects like safety and security, explainability of models as well as contributions to sustainability of battery production will be addressed.

Digital twins that include safety and security inputs. Sustainability Assessment of processes and products comprising the three pillars involved (environmental, economic, and social); Life Cycle Assessment (LCA), Life Cycle Costing Assessment (LCC) and Social Life Cycle Assessment.

HORIZON-CL5-2023-D4-01-01 Innovative cost-efficient solutions for zero-emission buildings (IA)

TOPIC DEADLINE 20/04/2023	BUDGET PER PROJECT 5 M€	TOTAL BUDGET 10 M€	EXPECTED NUMBER OF PROJECTS 2	TYPE OF ACTION IA
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Recycled, zero-carbon or sustainably sourced carbon-storing construction materials.

Different options in the development of new materials and construction systems aimed at reducing energy consumption and GHG emissions caused by HVAC (heating, ventilating, and air conditioning) systems, promoting sustainable criteria and moving towards a green economy through the design of novel solutions for zero-emission buildings:

- Development and characterisation of **new bio-based thermal insulation materials** based on **non-isocyanate polyurethane (NIPUs)**: CETIM can design eco-friendly thermal insulation materials by using lignin or carbonated oils to avoid isocyanate's use, a harmful substance with significant carcinogenic potential.
- Novel EIFS systems based on **natural hydraulic lime and non-isocyanate polyurethane (NIPUs)**: CETIM has the capability to design and characterise new eco-friendly thermal insulation materials through the use of lignin or carbonated oils, avoiding the use of isocyanate, which is a harmful substance with significant carcinogenic potential.
- **Innovative precast and modular system for green roofs including two components**: CETIM can design and develop a modular green roof system formed by two thermos-compressed layers: (a) an impermeable and anti-root thermosetting bio-based polymer, moulded to be tongue-and-groove assembled, and (b) an insulating and drainage biobased composite (based on porous biochar-alginate composite) as the substrate of the vegetal layer.
- **Novel sandwich panel for ETICS based on bio-based materials**. CETIM can develop different materials as a part of a sandwich panel for ETICS:
 - An improved natural insulation panel with compressed rice straw or textile with lignin-based additive to improve fire resistance.
 - Bio-mass-ash-based fibreboard for the external layers of the insulation
 - An innovative biobased adhesive mortar, for installing the sandwich panel to the existing wall or substrate, based on an alkali-activated binder with bio-mass ash, and a novel lignin-based resin.
- **Novel sandwich panel for interior insulation solution**. CETIM can develop different external layers for an insulation panel (same as ETICS) for installing as interior insulation:

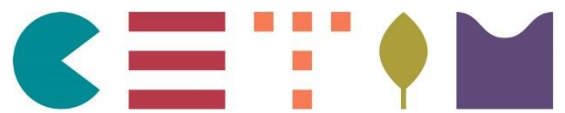
- Vapour control layer based on a novel clay-based mortar.
 - Thermal coating mortar based on air lime and biomass-ash.
- Design of nature based solutions to increase the sustainability of the buildings: green walls and green roofs as a source for the obtention of reused water in the building from grey water.

Development of materials under the Safe and Sustainable by Design framework

- Implementation of eco-design and Safe & Sustainable-by-design strategies to biobased materials, chemicals, and processes. Health, Safety and Risk assessment of novel processes and materials.
- Sustainability Assessment of processes and products comprising the three pillars involved (environmental, economic, and social); Life Cycle Assessment (LCA), Life Cycle Costing Assessment (LCC) and Social Life Cycle Assessment.
- Assessment of biodegradability (water, soil, compost...) and recyclability tests to assess sustainability and safety of novel product's end-of-life.

Equipment & facilities to work at lab and pilot scale in synthesis, compounding and composite formulations, moulding methods and characterization:

- High pressure homogenizer (lab and pilot scale).
- Pulper and ultraturrax (lab scale).
- Spray dryer (pilot scale).
- Non-pressurized reactor (lab and pilot scale up to 120 L).
- Pressurized reactor (lab scale and pilot scale up to 5 L).
- Mini and pilot plant extruder and microinjection.
- FDM 3D Printer.
- Peel off, cross cut, aging, mechanical and physical-chemical tests.
- Thermal conductivity meter.



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