

Présentation du programme de travail 2024

## Circular Economy + (Waste) Materials

#### 

Jean-Jacques Lemaire & Mathias Lucas

19/04/2023



1



# Agenda



- Présentation du programme de travail 2024
- Modalités pratiques
- Questions et réponses



# Horizon Europe: le programme UE de R&I

- Image: Section 2021 2027
  Image: Section 2021 2027
- > Pour les entreprises, universités et acteurs publics dans leurs activités de **recherche et d'innovation**



## **HORIZON EUROPE**



## Bon à savoir avant de se lancer

- Projets collaboratifs :
  - S entités ≠ issus de 3 pays ≠ (parfois exceptions)
  - 1 coordinateur, plusieurs partenaires
- Financement :
  - de 70 à 100%
- Pour qui ?
  - Toutes les entités juridiques : entreprises, universités, centres de recherche, administrations publiques – y compris les start-ups !
- Ø Ouverture des appels à proposition :
  - de manière périodique
  - prochaines deadlines > <u>outil « Appels ouverts et deadlines » du NCP-W</u>



5











## HORIZON-CL4-2024-TWIN-TRANSITION-01-32: Optimisation of thermal energy flows in the process industry

### Scope



60%+ of overall energy in process industry is heating. Need for highly integrated technologies for heat recovery and high temperature installations. Heat storage only as intermediate. One example: heat pumps for high temperature (150-250°C) for large thermal capacity (~1-20MW), direct excess heat reuse through advanced exchangers.



- Demonstrate integration of heat exchangers/heat pumps into high temperature processes. Where necessary, consider using advanced materials. High safety standard technologies, low environment impact. Demonstrate decrease of energy intensity.
- Include Innovation Fund GHG avoidance methodology.
- Energy efficiency, techno-economic, life-cycle assessment of the process. Care for socioeconomical and environmental impact.
- 2 PROJECTS 5  $\rightarrow$ 7 Colla
- Strong business case, exploitation plans for scalability, commercialization, deployment.
  - Collaboration with existing projects, funding programmes and platforms.

- Increase energy efficiency of industries by thermal energy flow optimisations.
- Demonstrate increased energy efficiency, and in process flexibility.
- Climate neutrality, increased resilience and competitiveness of Europe







IA

€



2 PROJECTS



## HORIZON-CL4-2024-TWIN-TRANSITION-01-38: Hubs for circularity for industrialised urban peripheral areas

### Scope

Joint collaboration between adjacent industries to minimise their CO2 footprint and circularise their waste management/2ndary materials (-> hub for circularity). Re-integrate flows of urban wastes in process industries (upcycling preferred).

• Create H4C, (non-)technological/(inter-regional), closing circularity loops for mixed/combined materials streams, water, energy or combination.

 Management and processing of 2ndary resource streams (disassembly, sorting, purification, ...), logistics and trading feedstocks for plants, compagnies (incl. manufacturing industry). Digital tools, sensor based sorting & characterisation, material passport. IT infrastructures allowing confidentiality.

• Co-development with urban district heating (cascading waste heat re-use)

• Foster partnerships (Symbiosis Readiness Level). Replication/extension plans, business cases and exploitation strategy of "first of kind hubs". 2-3 locations required. Implement social innovation action, education. May use other funding sources (Innovation Fund, LIFE, InvestEU, ISEF, ...)

- Reduce freshwater consumption by 50%, re-use 90% solid waste from water treatment
- Better industrial symbiosis, zero-waste, healthier environment



## (Critical) Raw Materials









RIA

€

5 M€

4 PROJECTS



# HORIZON-CL4-2024-RESILIENCE-01-01: Exploration of critical raw materials in deep land deposits

#### Scope

Map Europe's primary raw material potential and production using geoscientific approaches and refining capacities using harmonised form UNFC (United Nations Framework Classification for Resources) and UNRMS (United Nations Resource Management System)).

Develop & deploy new exploration technologies, sustainable, with improved efficiency (UAV assisted, 3D modelling, new drilling techniques, IA data processing, high resolution lab techniques, ...)

Improve awareness of general public about importance of raw materials for a successful transition to a climate-neutral and digitised society & economy, about the need for a sustainable and fair supply of raw materials, including domestic sources to strengthen EU open strategic autonomy and reduce over-dependence on third countries

WP for promotion activities (clustering activities, joint meetings, communication events,

## Expected outcomes

• Increase access to primary & secondary raw materials, resources and reserves, for EU industrial value chains. EU autonomy and ethical sourcing

• Innovative exploration technologies in deep land deposits in EU and non-EU countries

• Implementation of the EU action plan on Critical Raw Materals<sup>176</sup>

...)



# HORIZON-CL4-2024-RESILIENCE-01-10: Addressing due diligence requirements in raw materials supply chains

## Scope



2.2 M€

- Responsible sourcing in raw material value chain. Transparency in supply chain, address risks to human rights and environment.
- Better knowledge of supply chains due diligence, better tracability, base on existing related EU projects



7 Feb

2024

- Clustering activities with other relevant selected projects, co-operation, joint activities on cross-cutting issues, share of results (communication events->WP)
- Facilitate market uptake of industry- and user-driven solutions



1 project

- Increase access to primary and secondary raw materials (particularly Critical Raw Materials)
- Improve responsible supply & business of raw materials to EU
- Improve implementation of relevant regulatory initiatives
- Identify and address gaps in the raw materials supply chains due diligence



## HORIZON-CL4-2024-RESILIENCE-01-04: Technologies for processing and refining of critical raw materials

## Scope



• Demonstrate new processing&refining technologies for better recovery of raw materials from low grade and/or complex ores from extractive wastes-> less waste, higher energy efficiency. Target: minerals, metals (priority: critical materials). Less toxic elements in resulting materials. Hazardous substances management.



2024

**3** PROJECTS

- Robust adaptable process, flexible, to different primary/secondary grades
- End-of-life products excluding except if joint processing of waste streams (-> justify)
- Clustering activities, cooperation, joint activities

## Expected outcomes

- Increase recovery rates of valuable raw materials (particularly Critical Raw Materials)
- Significant increase in economic performance (higher material-, water-, energy- & costefficiency) + flexibility in minerals processing and metallurgical processes
- Improve health, safety, environmental performance + reduction of waster, wastewater, emissions
  - Improve responsible supply of raw materials to EU

gender balance exception







### Scope

IA

€

7.5 M€

7 Feb 2024

2 PROJECTS

→ 6-7 • Built on HORIZON-CL4-2023/24-RESILIENCE-01-02: Innovative technologies for sustainable & decarbonized extraction.

• Develop and demonstrate extraction and processing technologies to facilitate exploitation of the primary raw critical raw materials (++ EU Strength and supply chains)

• Clustering activities with other relevant selected projects, co-operation, joint activities on cross-cutting issues, share of results (communication events->WP)

- Facilitate market uptake of industry- and user-driven solutions
- Business case & exploitation strategy. Analysis of financial opportunities. Developed solutions should ensure replication of a circular business model.

- Strengthen EU cooperation with resource rich countries, improved responsible and sustainable supply. Industrial viability, safety, environmental impact. Diversify EU sourcing
  - Life cycle inventory data sets based on requirements for Environmental Footprint compliant datasets (2021 recommendations), focusing on existing knowledge gaps
  - Dissemination and exploitation tailored for Raw Material industries.



Batteries European

Partnarsh d



2024

2 PROJECTS

→ 5



### Scope

- Before Cobalt recovery in Li-Ion batteries, no-Co contents should be extracted first (plastics, metal shells and foils, binders, separators, Li Salt, organic solvent, anode active material). This pre-treatment ensures better yield in targeted materials recovery.
- Process design enabling recovery of anode materials, electrolytes (Li-salts),
- Recovery process for electrode current collectors (Al and Cu) (metal foils and organic binder separation) + all other strategic materials
- Process other non-active materials (solvent as EC, DEC, DMC, binders and separators)
- Pre-assess concepts by their life-cycle sustainability + safety impacts: technicoeconomical study minimising cost, environmental impact and system losses
- Strong business case for exploitation and dissemination plans

- More resilient, competitive and stronger base for European economy, fit for the green and digital transition. Reduced dependency for CRM (circular economy)
- Holistic development of the EU battery industry (zero waste, better communication between recyclers and manufacturers)
- Environmental benefits. Safer technologies and better recovery yield, purity, ...



## Equipements énergétiques







## HORIZON-CL5-2024-D3-01-07: Development of hydropower equipment for improving techno-economic efficiency and equipment resilience in refurbishment situations

## Scope



Develop hydropower equipment for improving techno-economic efficiency and equipment resilience in refurbishment situations of existing hydropower plants, outdated in terms of efficiency, power market interfacing, climate change adaptation or environmental sustainability (biodiversity).



• Equipment developed should not require substantial modification of hydraulic systems and implement circularity by design (low-friction and high resistance materials)



2 PROJECTS

→ 4-5

- Positively affect CAPEX&OPEX per KWh, be compliant with water quality and biodiversity improvement.
- Assess socio-economical impacts & environmental sustainability (incl. SDGs), circular economy impact on a life-cycle basis.

- Keep availability of existing hydropower fleet and increase potential of hydropower
- market (European leadership, energy sustainability, availability and cost)





HORIZON-CL5-2024-D3-02-08: Minimisation of environmental, and optimisation of socio-economic impacts in the deployment, operation and decommissioning of offshore wind farms

## Scope



Develop and promote use of modelling tools and holistic assessment of impact of wind installations on environment and on local communities and integrate results in for deployment and decommissioning of offshore wind farms.



2025

2 PROJECTS

• Action 1: Develop planning tools to minimize overall life-cycle impact of floating and fixed-bottom wind farms (noise, visual impact, environmental effects). Use environmental impact studies' data, inventory data of the components from industry. Develop easy to customize tool, delivering simple and measurable criteria assessment data.

• Action 2: Develop innovative and cost-effective solutions (processes, planning tools, supply chains, construction materials, ...) for all phases of the life-cycle of offshore wind farms, especially for the installation, construction and decommissioning phases, to reduce as much as possible environmental impact during these phases.



### Expected outcomes

• Enhanced sustainability of offshore wind farms and large-scale production sites

• Improved understanding of impacts of windfarms throughout their lifetime and innovative/cost-effective solutions for installation/decommissioning of wind farms minimising their environmental impact.



## Capture carbone - eFuels









Clean Hydrogen Partnership

# HORIZON-CL5-2024-D3-02-02: Development of next generation synthetic renewable fuel technologies

### Scope





4 M€

Development of next generation technologies for the production of novel synthetic renewable liquid and gaseous fuels from  $CO_2$  and/or renewable carbon, nitrogen, hydrogen or their compounds, from renewable energy. Synergies from other renewable energy technologies possible. Focus on high conversion & process efficiency, and carbon neutrality from the overall production. Improve competitiveness and GHG emissions in the process.

Production pathways from renewable  $H_2$  or renewable  $H_2$  ionic compounds or all form of renewable energy are in scope. Consider use in fuel cells for electricity production.



**3** PROJECTS

2025

Assess sustainability and GHG emissions basing on a Life Cycle Analysis.

Collaborate with Clean Hydrogen Joint Undertaking when relevant, with participation to the TRUST database and hydrogen observatory



## Expected outcomes

- Increase availability of disruptive emerging synthetic renewable fuel technologies
- Accelerate the readiness of cost-effective and highly performing synthetic renewable fuels

Reinforce European scientific basis & European technology export potential



link with topics: HORIZON-CL6-

2023-

ZEROPOLLUTION

INNOVATION

HORIZON-CL5-2024-D3-02-03: Development of smart concepts of integrated energy driven bio-refineries for co-production of advanced biofuels, biochemicals and biomaterials

## Scope



21 Jan 2025

**2** PROJECTS

 $\stackrel{\times}{\rightarrow}$ 

5

Development of zero-waste, carbon neutral/negative emission energy efficient biorefinery concepts, for enabling the production of low-cost next generation advanced biofuels, through co-production of added value bio-based products and bioenergy (e.g.: conversion through highly-circular processes of biogenic waste, alguae, aquatic biomass through chemical, biochemical, thermochemical, ... processes).

Assess feedstock cost supply at regional and local level and get support from enabling technologies (digitalisation) to help mobilising the feeds.

Assess socio-economic and environmental sustainability, circularity on a Life Cycle Analysis basis. Evaluate economic feasability and scale-up

Cost of the advanced biofuels should be on pair with marketed biofuels or be competitive to the fossile fuels equivalents.

Cooperation with Mission Innovation countries expected.

- Expand the portfolio of cost-effective advanced biofuels through energy-driven refineries. Optimise resources' efficiency, reduce cost and derisk the production
- Reinforce European scientific basis & European technology export potential



## HORIZON-CL5-2024-D3-02-11: CCU for the production of fuels

#### Scope

Development of energy-efficient, environmentally/economically viable CO2 conversion technologies, including energy storage and/or displacement of fossil fuels that allows for upscaling in the short to medium term.

Ambitious but achievable targets for energy requirements in the process (inc. catalytic conversion), production costs and yields. Results will be monitored in the implementation. Include the CO2 mitigation calculation from Innovation Fund GHG emissions avoidance calculation methodology.

Societal readiness of the technologies must be considered with relevant stakeholders (authorities, civil society organisations, SSH actors, ...)



IA

€

7 M€

0

21 Jan

2025

• Exploitation/deployment plans, business cases and dissemination plans of results.

2 PROJECTS

4-5 → 6-7

- Join EU CCUs knowledge sharing network. If relevant, collaborate with Clean Hydrogen Undertaking.
- Expected outcomes
- Promotion of CO2 capture as fossil fuels replacement and seasonal energy storage.
  - Improved technology to lower the energy required in the conversion process
  - New markets for developed solutions. Integration of the  $CO_2$  capture to industry (symbiosis)

## HORIZON-CL5-2024-D3-02-12: DACCS and BECCS for CO2 removal/negative

## emissions

**DACCS**: Direct Air Carbon Capture and Storage **BECSS**: BioEnergy Carbon Capture and Storage

## Scope

IA (€

5-7 M€

Further development of those technologies to fight climate change. The potential technologies require major breakthroughs (enhanced oil recovery not considered).

Societal readiness of the technologies must be considered with relevant stakeholders (authorities, civil society organisations, SSH actors, ...)



• Exploitation plans, business cases and dissemination plans of results.

Exchanges with EU ETS Innovation Fund and EU Catalyst partnership, Mission Innovation countries, Carbon Dioxide Removal Mission, EU CCUs knowledge sharing network



21 Jan

2025

- Improve materials/develop new materials for DACCS & BECCS
- Address barriers to incorporation of DACCS/BECCS in existing CCUs concepts
  - × → 6-7
- Make DACCS/BECCS technologies viable for EU carbon neutrality, increase TRL and reduce cost of the technological options.





# Rénovation – performance énergétique





## HORIZON-CL4-2024-TWIN-TRANSITION-01-12: Enhanced assessment, intervention and repair of civil engineering infrastructure

## Scope



15-20 M€

2 PROJECTS

 $\rightarrow$  6

1 – 7 Feb 2024 2 – 24 Sep 2024

2 Stage

Maintenance and repair extend life of civil engineering infrastructures. Focus on difficult to access equipment.

• Develop new technologies for easier diagnostic, monitoring and maintenance (e.g.: structural weaknesses, fatigue, moisture issues, faults, leaks, weather-related events, ...). Develop monitoring and quick analyse tools and assess the need for repair through digital twin or simulation technology. Risk assessment and prioritisation.

- Reduce the risk for workers in maintenance and repair operations
- Build on existing standards, contribute to new ones. Skills development strategies (contribute with SSH)
- Collaboration with existing projects, funding programmes (NEB) and platforms.

- Extend service life of civil engineering infrastructure, minimise their CO2 footprint.
- Develop new monitoring/analysis tools for cost-efficient and safer maintenance and repair operations



## HORIZON-CL5-2024-D4-01-01: Low-disruptive renovation processes using integration of prefabricated solutions for energy-efficient buildings

## Scope



Low-disruptive renovation processes, using quick&easy to apply prefabricated modules can increase renovation rate in the European building stock. Renovation process should cover the whole process from the design, manufacturing, installation, compliance checking and end-of-life.



18 Apr

2024

- Develop renovation processes for NZEB performance through prefabricated modules.
- Reduce quality gaps between off-site manufacturing and on-site deployment
- Reduce annoyances from installation and unavailability of the buildings.



• At least 3 demonstrations with different building categories (residential/tertiary) and various building typologies

## 2 PROJECTS Expected outcomes



- Reduce on-site construction activities to 1-2 days/building unit, cost reduction: -25% vs conventional techniques.
- Significant reduction of noise/dust/waste & disturbances
- Improved indoor air quality, comfort
- Reduced impact on environment. Better resilience to disruptive events.



200

Built4People

## HORIZON-CL5-2024-D4-02-01: Industrialisation of sustainable and circular deep renovation workflows

### Scope



2024

2 PROJECTS

Х

→ 6-8 Increased building renovation rate & depth require new workflows.

• Innovative approaches for industrial deep circular renovation covering the whole workflow (design, off-site prefabrication, installation, maintenance, operation and end of life). Select most efficient techniques for fast and broad deployment throughout Europe

• Involve any innovative/existing process/technology (materials, digital tools, ...) with NZEB energy performance, indoor comfort and attractive cost for owners/investors.

- Demonstrate seamless integration with digital tools (BIM, digital twins, ...)
- At least 3 demonstrators with different building typologies
- Contribute to Build4People (partners & network of innovation clusters)

- Near zero-energy performance renovation processes, high construction quality
- Renovation with reduction of at least 30% waste, 25% cost, 30% work (1-2days/building)
- New innovative business models, increased renovation rate
- Improved comfort, indoor air quality



200

Built4People

## HORIZON-CL5-2024-D4-02-03: BIM-based processes and digital twins for facilitating and optimising circular energy renovation

## Scope



0

21 Jan

2025

2 PROIECTS

× → 6-8

- Better energy efficiency and sustainability in building sector, through solutions based on **<u>B</u>uilding Information Modelling** and Digital Twins supporting the full building life cycle.
- Support optimal, reversible, adaptable designs for energy efficiency, circularity, sustainability. Allow to track building materials for cost-effective deconstruction&reuse.
- Integrate monitoring data (sensors, IoT) into interoperable digital twin to optimize building performance monitoring, management and preventive maintenance.
- Ease of use and cost effectiveness especially for SMEs
- At least 2 demonstrations on sets of real-life residential/no-residential building construction and renovation projects. At least 2 countries with different climate conditions. Involve local & regional value chains (SMEs)
- Contribute to Build4People (partners & network of innovation clusters)

- Reduced buildings construction & renovation costs/increased material reuse&recycling
- Better data interoperability with existing BIM & Digital Twins, broader applications, in particular for SMEs
- Better building performance (sustainability, energy use, comfort, ...)



-

Built4People

## HORIZON-CL5-2024-D4-02-04: Design for adaptability, re-use and deconstruction of buildings, in line with the principles of circular economy

### Scope



- Validate construction/renovation techniques based on integration of innovative tools, products, techniques, processes and methods, facilitating deconstruction&reuse.
- Adaptability/reversibility to changing uses
- Improve reuse of construction elements/products from existing buildings, facilitate recycling otherwise
- Develop building elements/products able to disassemble/reuse, including CO2-storing materials, long-lived biobased, innovative lower emission materials/aggregates. All building components. Rooted in local/regional value chains in a participative approach.



2025

- At least 2 demonstrations on real-life residential/no-residential environments. At least 2 countries with different climate conditions. Involve local & regional value chains (SMEs)
- Deliver guidance, recommendations for regulations/standardisation. Strong dissemination plan
- Contribute to Build4People (partners & network of innovation clusters)

## Expected outcomes

- Improve adaptability of buildings to new uses, extend their service life, reuse/recycling
- Increase awareness on best practices for design for adaptability, reuse and deconstruction

Х

→ 5-6



-

Built4People

## HORIZON-CL5-2024-D4-02-05: Digital solutions to foster participative design, planning and management of buildings, neighbourhoods and urban districts

## Scope

- European building stock needs to be climate-neutral, resilient to climate change and adaptable to societal changes & needs. Every actors needs to communicate together.
- € 5 M€

IA



2025

2 PROIECTS

× → 6-8

- Develop digital solutions to facilitate participative design and planning through visualization (VR/AR), analysis and engagement with data from users & citizens.
- Develop digital solutions to analyse and model various scenarii of building renovation. Analyse impacts on energy use, citizen health/wellbeeing, provision for electric mobility, impacts on climate and environment, ...
- Address climate neutrality/resilience aspects, build on existing tools and recognized standards, Engage citizens, Facilitate data exchange and take into account minorities and vulnerable persons.
  - At least 3 demonstrations on real-life urban development projects
  - Contribute to Build4People partnership +New European Bauhaus Community

- Greater engagement of ends users and citizens of the impacted urban context
- Greater engagement/respect of users/citizens, acceptability & uptake of energetic renovation
- Enhanced climate change adaptation & resilience in built environment.

INFORMER | ACCOMPAGNER | CONNECTER









Informer



Accompagner



Connecter



# Etapes pour rédiger un projet UE





31





# Trouver l'appel/le topic adéquat

- Info-days de la Commission européenne;
- Outil en ligne 'Appels ouverts et deadlines';
- Workshops & Newsletters du NCP Wallonie;
- Contactez nos conseillers !



TWO

Stoge







# **Chercher des partenaires**

- Votre réseau !
- Bases de données UE :
  - Site internet de la Commission européenne : <u>Recherche de partenaires</u>
  - Projets passés/en cours : Qlik Q QlikView
- Journées d'informations/de réseautage : Magenda NCP Wallonie







## **Diffuser son profil**

## One Page Expertise

## Organisation

Contribution au projet/valeur

Topic

ajoutée

ncp

#### ONE PAGE EXPERTISE DESCRIPTION

The aim of this document is to introduce your organisation to potential project leaders. Since there are hundreds of such descriptions circulating throughout Europe, please keep it short, concise and precise so potential project coordinators can quickly assess if your contribution would be useful. This document does not aim to provide an extensive overview of your activities, but to show in a few words your added value relevant to a specific topic or group of topics. Please fill in one form per field or research/expertise.

#### NFORMATION ABOUT THE EXPERT

DRGANISATION	
ADDRESS	
YPE OF PARTNER	. SME. University, Research Centre, Large Company, Public Administration, Association, other
WEBS/TE	
ONTACT PERSON	
MAIL	
ELEPHONE	
Position	
DATE OF PUBLICATION	
Expernise Overview	·
OPIC(S) OF INTEREST:	- maximum 3 different topics

HEADLINE:

1 line general description of your general expertise

#### POTENTIAL CONTRIBUTION:

Please describe here the specific knowledge, technology or other contribution that your organisation could provide to add value to a project. You are encouraged to include references to relevant publications, patents or former projects, in particular European projects (FP7, H2020 or others).

Please take into account that this document will be the base to convince a key player to invite you in his consortium:

- highlight your strengths
- be persuasive









## **Merci pour votre attention**

Retrouvez-nous sur ncpwallonie.be

## Jean-Jacques Lemaire Mathias Lucas

: jean-jacques.lemaire@ncpwallonie.be : mathias.lucas@ncpwallonie.be



**VCPWallonie** 

