



MINISTÈRE  
DE L'ENSEIGNEMENT  
SUPÉRIEUR  
ET DE LA RECHERCHE

*Liberté  
Égalité  
Fraternité*



# Le programme européen pour la recherche et l'innovation



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# Cluster 5 - Climate, Energy and Mobility



*Presentation of calls under WP 2023-  
2024*

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# THE EUROPEAN UNION'S FRAMEWORK PROGRAM FOR RESEARCH AND INNOVATION

↘ 2021 – 2027

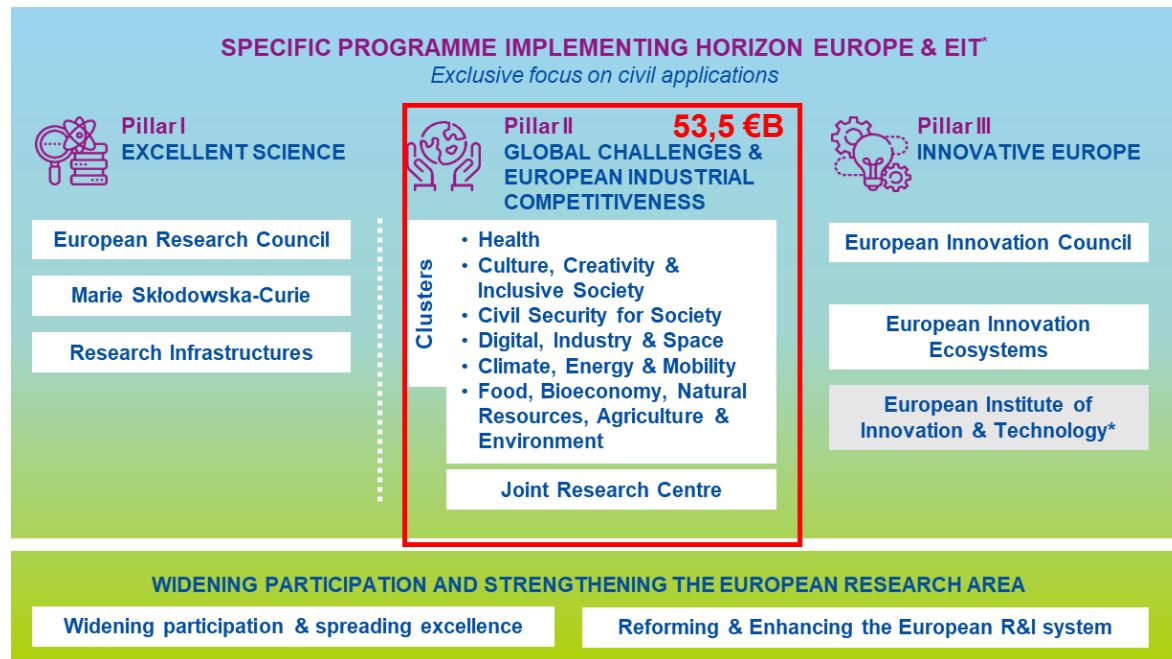
↘ 95,5 €B

↘ Strengthening the Union's **scientific and technological bases**.

↘ Stimulating its capacity for **innovation, competitiveness and job creation**.

↘ To make the Union's **strategic political priorities** a reality.

↘ To contribute to meeting **global challenges**, including the United Nations' sustainable development objectives.



- Horizon Europe **'by-default' open** to almost all countries, on a non-discriminatory basis
  - **Association to the programme:**
    - 16 Countries associated to HE: Albania, Armenia, Bosnia and Herzegovina, Faroe Islands, Georgia, Iceland, Israel, Kosovo, Moldova, Montenegro, North Macedonia, Norway, Serbia, Tunisia, Turkey, Ukraine
    - “In the process of Association”: Morocco, UK
    - Negotiations under way: New-Zealand, Canada...
    - **The associated countries have access to Horizon Europe funding !**
  - **Low- and middle-income countries** (see list) are also **automatically eligible** for EU funding
  - **Non-associated third countries** not eligible for EU funding
    - Exceptions on a case-by-case basis + specified in topic calls
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	Topics total	Topics (ex Other Actions)	International cooperation encouraged	%
Cluster 1: Health	53	44	7	16%
Cluster 2: Culture, creativity and inclusive society	66	56	15	27%
Cluster 3: Civil Security for Society	44	42	9	21%
Cluster 4: Digital Industry and Space	159	130	22	17%
Cluster 5: Climate, Energy and Mobility	219	191	38	20%
Cluster 6: Food, Bioeconomy, Natural resources, agriculture, and environment	189	179	51	28%
	730	642	141	22%



# Cluster 5: Destinations and "sub-destinations"

## Architecture of the 2023-2024 work program

### Destination 1 – Climate sciences and responses for the transformation towards climate neutrality

### Destination 2 – Cross-sectoral solutions for the climate transition

- A competitive and sustainable European battery value chain
- Emerging breakthrough technologies and climate solutions
- Cross-cutting

### Destination 3 – Sustainable, secure and competitive energy supply

- Global leadership in renewable energy
- Energy systems, grids & storage
- Carbon Capture, Utilization and Storage (CCUS)

### Destination 4 – Efficient, sustainable and inclusive energy use

- Highly energy-efficient and climate neutral European building stock
- Industry

### Destination 5 – Clean and competitive solutions for all transport modes

- Zero-emission road transport
- Aviation
- Waterborne transport
- Transport-related health and environment

### Destination 6 – Safe, Resilient Transport and Smart Mobility services for passengers and goods

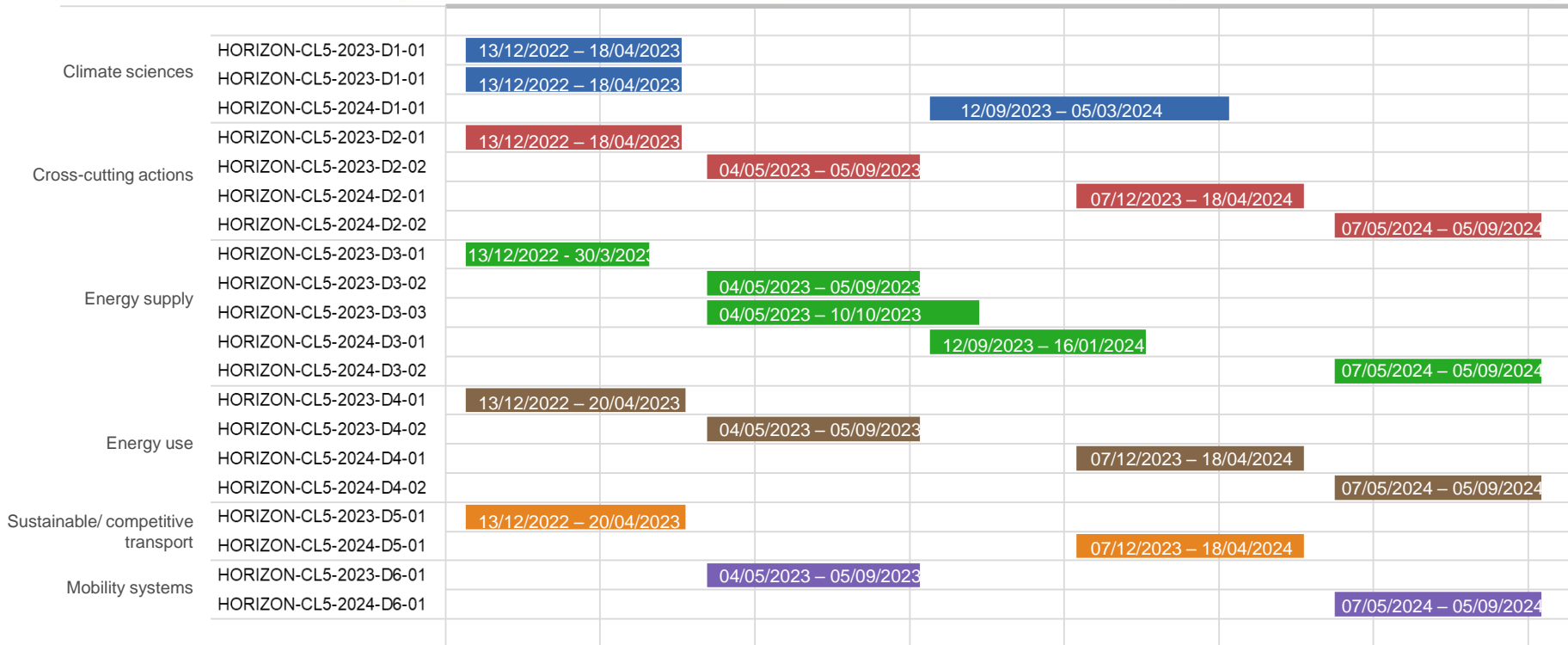
- Connected, Cooperative and Automated Mobility (CCAM)
- Multimodal transport, infrastructure and logistics
- Safety and resilience



# Cluster 5: Destinations and "sub-destinations"

## Synthetic view of the different waves

1/12/2022      2/03/2023      1/06/2023      31/08/2023      30/11/2023      29/02/2024      30/05/2024      29/08/2024



Dest.	Area	Topic code	Topic title	Targeted zone	Type of action	TRL (at the end of the project)	Deadline
1	International cooperation	HORIZON-CL5-2023-D1-01-11	Needs-based adaptation to climate change in Africa	Africa	RIA		18/04/2023
3	Renewable Energy	HORIZON-CL5-2023-D3-02-16	Accelerating the green transition and energy access in Africa	African Union	IA	7	05/09/2023
3	Renewable Energy	HORIZON-CL5-2024-D3-01-09	Africa-EU CO-FUND action	African Union	COFUND		16/01/2024



# Topics where international coop. is encouraged

## With geographical indication

Dest.	Area	Topic code	Topic title	Targeted zone	Type of action	TRL	Deadline
1	Climate change mitigation	HORIZON-CL5-2024-D1-01-05	Next generation low-emission, climate-resilient pathways and NDCs for a future aligned with the Paris Agreement	African Union and Least Developed Countries	RIA		05/03/2024
2	Batteries	HORIZON-CL5-2023-D2-01-01	Technologies for sustainable, cost-efficient and low carbon footprint downstream processing & production of battery-grade materials (Batt4EU Partnership)	Africa, USA, Mediterranean region	RIA	5	18/04/2023
2	Batteries	HORIZON-CL5-2023-D2-01-05	Hybrid electric energy storage solutions for grid support and charging infrastructure (Batt4EU Partnership)	USA, India, Australia, Africa	IA	7	18/04/2023
2	Batteries	HORIZON-CL5-2024-D2-01-02	Non-Li Sustainable Batteries with European Supply Chains for Stationary Storage (Batt4EU Partnership)	India, Africa, Australia	IA	6-7	18/04/2024
3	RE	HORIZON-CL5-2023-D3-01-04	Solar Systems for Industrial Process Heat and Power	Mediterranean region	IA	6-7	30/03/2023
3	RE	HORIZON-CL5-2023-D3-02-08	Development of microalgae and/or direct solar fuel production and purification technologies for advanced aviation and /or shipping fuels	EU-African Union Partnership and Mission Innovation countries	RIA	4-5	05/09/2023
3	RE	HORIZON-CL5-2024-D3-01-04	Improvement of light harvesting and carbon fixation with synthetic biology and/or bio-inspired//biomimetic pathways for renewable direct solar fuels production	EU-African Union Partnership and Mission Innovation countries	RIA	3-4	16/01/2024
3	Energy Systems, grids & storage	HORIZON-CL5-2024-D3-01-13	DC and AC/DC hybrid transmission and distribution systems	Mediterranean region	RIA	4-5	16/01/2024
3	RE	HORIZON-CL5-2024-D3-02-06	Innovative, Community-Integrated PV systems	Mediterranean region	IA	6-7	05/09/2024
3	RE	HORIZON-CL5-2024-D3-02-07	Resource Efficiency of PV in Production, Use and Disposal	Mediterranean region	CSA		05/09/2024
5	2ZERO	HORIZON-CL5-2023-D5-01-03	Frugal zero-emission vehicles concepts for the urban passenger challenge (2ZERO Partnership)	Emerging economies, e.g. Asia or Africa	IA	7-8	20/04/2023

# Topics where international coop. is encouraged

## Without geographical indication

Dest.	Area	Topic code	Topic title	Type of action	TRL	Deadline
1	Earth system science	HORIZON-CL5-2023-D1-01-01	Further climate knowledge through advanced science and technologies for analysing Earth observation and Earth system model data	RIA		18/04/2023
1	Climate change mitigation	HORIZON-CL5-2023-D1-01-06	Broadening the range of policy options in transition pathway analysis	RIA		18/04/2023
1	Earth system science	HORIZON-CL5-2024-D1-01-02	Inland ice, including snow cover, glaciers, ice sheets and permafrost, and their interaction with climate change	RIA		05/03/2024
1	Climate change mitigation	HORIZON-CL5-2024-D1-01-04	Improved toolbox for evaluating the climate and environmental impacts of trade policies	RIA		05/03/2024
1	Climate-ecosystem interactions	HORIZON-CL5-2024-D1-01-07	Quantification of the role of key terrestrial ecosystems on the carbon cycle and related climate effects	RIA		05/03/2024
2	Cross-cutting	HORIZON-CL5-2023-D2-01-08	Driving Urban Transition Co-funded Partnership	COFUND		18/04/2023
3	Renewable Energy	HORIZON-CL5-2024-D3-02-10	Market Uptake Measures of renewable energy systems	CSA		05/09/2024
5	2ZERO	HORIZON-CL5-2023-D5-01-04	Circular economy approaches for zero emission vehicles (2ZERO Partnership)	RIA	5	20/04/2023
5	Aviation	HORIZON-CL5-2023-D5-01-07	Hydrogen-powered aviation	IA	6	20/04/2023
5	Aviation	HORIZON-CL5-2024-D5-01-07	Accelerating climate neutral aviation, minimising non-CO2 emissions	RIA	2-4	18/04/2024
6	Multimodal transport, infrastructure and logistics	HORIZON-CL5-2023-D6-01-08	Future-proof GHG and environmental emissions factors for accounting emissions from transport and logistics operations	CSA		05/09/2023
6	Multimodal transport, infrastructure and logistics	HORIZON-CL5-2024-D6-01-06	Optimising multimodal network and traffic management, harnessing data from infrastructures, mobility of passengers and freight transport	RIA	5	05/09/2024
6	Safety and resilience	HORIZON-CL5-2024-D6-01-11	Effects of disruptive changes in transport: towards resilient, safe and energy efficient mobility	RIA		05/09/2024



## Dest. 2: Topics where cooperation is encouraged

### Batteries

Mediterranean region

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

RIA (TRL 5)

Estimated financed projects: 3

EU contribution/projet: 7M€

Opening: 13/12/2022

Deadline: 18/04/2023

#### **Expected outcomes:**

- Stronger, more resilient, more competitive European economic base for green and digital transitions.
- Increased European competitiveness by providing sustainable battery material production technologies.
- Battery-grade intermediates developed, produced and refined in a sustainable and socially acceptable manner.
- Proof of the technical feasibility of downstream processing of battery-grade materials on a larger scale.
- Stronger European battery manufacturing industry.
- Use of European sources after exploitation of raw and secondary materials such as residues.

#### **Scope:**

- Develop sustainable and cost-efficient processing methods for battery-grade materials and components
- Develop and demonstrate technologies to improve the production, refining/recycling of metals and materials.
- Address zero waste and zero discharge strategies during refining processes.
- Pre-assess recycling concepts in terms of their life cycle sustainability and safety impact.
- Understand the physico-chemical mechanisms for a more sustainable development of the hydrometallurgical process.
- Implement a continuous process for the synthesis of cathode active materials on a larger scale. Include a sound business case and operating strategy.



## Dest. 3 : Topics where cooperation is encouraged

### Renewable energies - PV/Solar

Mediterranean region

#### HORIZON-CL5-2023-D3-01-04: Solar Systems for Industrial Process Heat and Power

IA (TRL 6-7)  
Estimated financed projects: 2  
EU contribution/projet: 7M€  
Opening: 13/12/2022  
Deadline: 30/03/2023

#### Expected outcomes:

- Integration of efficient solar resources in the industrial sector to achieve low carbon and emission free production systems.

#### Scope:

- Demonstrate a system that, given the solar energy generation potential, topographical features, land use constraints and system performance, generates medium temperature heat and power in a modular PV and ST (Solar Thermal) hybrid design with a low environmental footprint, low cost and high efficiency.
- Demonstrate the potential of hybrid (PV and ST) approaches that generate heat and power to supply a wide range of manufacturing end uses.



## Dest. 3 : Topics where cooperation is encouraged

### Energy system, networks and storage

Mediterranean region

#### HORIZON-CL5-2024-D3-01-13: DC and AC/DC hybrid transmission and distribution systems

RIA (TRL 4-5)

Estimated financed projects: 2

EU contribution/projet: 6M€

Opening: 12/09/2023

Deadline: 16/01/2024

#### Expected outcomes:

- Demonstration of the top-down power system orchestration of the future pan-European hybrid AC/DC system architecture - including the offshore grid and energy islands
- Development of methodologies for operational planning and design of hybrid DC and AC/DC systems, taking into account all possible sources, loads and storage, from the high voltage transmission level to the assets connected to the distribution.
- Development of methodologies for interoperability between multi-terminal and multi-vendor MVDC and LVDC systems.
- Demonstration of technologies to address the progressive loss of inertia due to the increasing penetration of generators interfaced with power electronics
- Close collaboration between key stakeholders in the network

#### Scope:

1. Addressing R&I, methodologies and tools involving the activities of the three sub-themes (A, B and C) listed below. These activities can be developed/complemented by others relevant to each sub-theme.
  - A. Design and planning of hybrid DC - AC / DC systems (demonstration of software tools for planning and management, fallibility and resilience methodologies for safety criteria, and methodologies for interoperability between systems)
  - B. AC and DC network formation capability
  - C. DC distribution and microgrids (modelling, planning and design of networks...)
2. Demonstrate, test and validate the activities developed in (1) in at least three pilots - one for each sub-theme (A, B and C) - in different EU Member States/Associated Countries.



## Dest. 3 : Topics where cooperation is encouraged

### Renewable energies - PV/Solar

Mediterranean region

#### HORIZON-CL5-2024-D3-02-06: Innovative, Community-Integrated PV systems

IA (TRL 6-7)  
Estimated financed projects: 2  
EU contribution/projet: 5M€  
Opening: 07/05/2024  
Deadline: 05/09/2024

#### Expected outcomes:

- Increasing the profitability and penetration of PV systems in renewable energy communities.
- Active engagement of citizens and communities in the transition to clean energy, including the adoption of energy cooperatives and the development of decentralised platforms.

#### Scope:

- Demonstrate an aggregated community system with a portfolio of producers and users to facilitate the energy transition to a low carbon economy.
- Effectively address the need to overcome energy poverty, support energy democracy and expand cooperative solutions for the collective benefit of suppliers and users.
- Implement advanced planning, installation optimisation tools, and installation criteria to increase the efficiency and thus the economic performance of PV systems in the built environment.
- Implement collective self-consumption schemes, design, simulation, integration with storage, interaction with electric mobility and interaction with the electricity grid to ensure power flexibility.
- Develop robust protocols, communication and cooperation between the different levels of control, offering the benefits of power electronics, sensors and advanced intelligent systems.
- Include an effective contribution from SSH, taking into account social innovations especially as new tools, ideas and methods leading to active citizen engagement and as drivers of social change



## Dest. 3 : Appels où la coopération est encouragée

Renewable energies - PV/Solar

Mediterranean region

### HORIZON-CL5-2024-D3-02-07: Resource Efficiency of PV in Production, Use and Disposal

CSA

*Estimated financed projects: 1*

*EU contribution/projet: 3M€*

*Opening : 07/05/2024*

*Deadline : 05/09/2024*

#### Expected outcomes:

- Reduction of the environmental footprint associated with the deployment of PV technology across all phases of the system's life (production, transport, installation and end-of-life).
- Design and processing guidelines to optimally address the circularity of PV systems for one or more PV technologies (silicon, thin film, organic PV, perovskite PV, etc.)

#### Scope:

- Consider the whole life cycle of the technology, including gaining knowledge about the processes and materials that contribute most to the overall environmental footprint, identifying key candidates for reducing the use of materials, and developing a strategy for reducing the environmental impact of the technology.
- Reducing the carbon footprint, using local materials to reduce transport costs in systems, avoiding the use of hazardous materials and designing systems and their components to encourage recycling and reduce the use of materials.
- Develop modern environmentally friendly technologies and repairable and sustainable products, in combination with circular economy approaches

# Thank you !

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