





Artemios Kourtesis European Commission Head of Sector RTD C.5 "Ecological and Social Transitions"



Overview



European Partnerships



Transforming Europe's rail system

(0.6 bn€ EU contribution; 0.6 bn€ private contributions)

Integrated Air Traffic Management

(0.6 bn€ EU contribution; 0.5 bn€ private contributions; 0.5 bn€ from Eurocontrol)

Clean Aviation

(1.7 bn€ EU contribution; 2.4 bn€ private contributions)

Clean Hydrogen

(1.0 bn€ EU contribution; 1.0 bn€ private contributions)

CO-FUNDED

CET | Clean Energy Transition (210 M€ EU contribution)

DUT | Driving urban transitions to a sustainable future (130 M€ EU contribution)

CO-PROGRAMMED

Built4People | People-centric sustainable built environment

(380 M€ EU contribution; 400 M€ private contributions)

ZEWT | Zero-emission waterborne transport

(530M€ EU contribution; 3300 M€ private contributions)

CCAM | Connected, Cooperative and Automated Mobility (500 M€ EU contribution; 500 M€ private contributions)

2ZERO | Towards zero-emission road transport

(615 M€ EU contribution; 615 M€ private contributions)

Batt4EU | Towards a competitive European industrial battery value chain

(925 M€ EU contribution; 925 M€ private contributions)

Total: 3.9 bn€ EU contribution

Total: 0.34 bn€ EU contribution

Total: 2.95 bn€ EU contribution



Overarching expected impacts for Cluster 5



Transition to a climate-neutral and resilient society and economy enabled through advanced climate science, pathways and responses to climate change (mitigation and adaptation) Destination 2

Clean and sustainable transition of the energy and transport sectors towards climate neutrality facilitated by innovative **crosscutting solutions** More efficient, clean, sustainable, secure and competitive **energy supply** through new solutions for smart grids and energy systems based on more performant renewable energy solutions

Destination 3

Efficient and sustainable **use of energy**, accessible for all is ensured through a clean energy system and a just transition

Destination 4



Towards climateneutral and environmental friendly mobility through clean solutions across all transport modes while increasing global competitiveness of the EU transport sector



Safe, seamless, smart, inclusive, resilient, climate neutral and sustainable **mobility** systems for people and goods



Cluster 5 work programme – Overview





WP 2023-2024: EU policy objectives



Destination

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• More energy-efficient

Contribution to RePowerEU

 Cheaper and more performant renewable energy technologies (solar energy, wind energy, ocean energy, geothermal energy, hydro power, renewable fuels, heat pumps, solar heating)

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Destination

- More flexible and resilient energy grids
- Better and smarter energy storage solutions





RePowerEU flagships

Renewable Energy Valleys to increase energy security while accelerating the green transition in Europe

Hydrogen-powered aviation

25M€ Innovative solutions for <u>cost-effective decarbonisation of buildings</u> through energy efficiency and electrification

Supporting the development of a <u>digital twin</u> to improve management, operations and resilience <u>of the EU Electricity System</u> in support to REPowerEU

30M€

34M€

20M€

40M€

20M€

Demonstration of innovative, <u>large-scale, seasonal heat and/or cooling storage technologies</u> for decarbonisation and security of supply

Demonstrations to accelerate the switch to safe use of **new sustainable climate neutral fuels in waterborne transport**

In total, at least 77 topics (1.18 bn€) of CL5 WP 2023-2024 contribute to REPowerEU



EU Hydrogen Strategy

EU Solar Strategy

Cluster 5 work programme 2023-2024

Covering the whole hydrogen value chain:

- Climate impact of the hydrogen economy
- Hydrogen test bed
- Storage
- Energy production
- Fuel production (aviation, waterborne transport)

In total 17 topics for a total of 284,5 M€

+ Activities of the Clean Hydrogen Joint Undertaking

Horizon Europe *Flagship Initiative* for the Solar Strategy covers:

- Concentrated Solar Power (CSP)
- Photovoltaics (PV)
- Solar Heat & Power

In total 14 topics for a total budget of 151 M€



How to maximise impact of R&I activities in CL5?

European Partnerships	Around 30% of topics and budget support industry priorities in industry-led Partnerships			
Innovation Actions	Almost 45% of topics are Innovation Actions targeting TRL 6 or higher			
Large-scale demonstration	100 M€ of support together with the Breakthrough Energy Catalyst Fund (in 2023-2024)			
Standardisation	37 topics contribute to standardisation			
Societal dimension	52 topics (28% of all topics) require active societal engagement and integration of so sciences and humanities in project preparation and implementation (including in 'technical' topics)			
International cooperation				







Budget distribution in calls for proposals for 2023-2024

	Budget (M€)	Budget share	Number of topics	Topics share
D1 – Climate science	220,5	9%	20	11%
D2 – Cross-cutting	281,0	12%	19	10%
D3 – Energy supply	1.023,6	43%	69	37%
D4 – Energy demand	208,0	9%	19	10%
D5 – Transport	419,1	18%	37	20%
D6 – Smart mobility	231,0	10%	25	13%
TOTAL	2.383,2	100%	189	100%

EU contribution per Destination and type of action (2023-2024, in M€)





Budget distribution

EU contribution per thematic area (2023-2024, in M€)



European Partnerships:

- 60 out of 189 topics (32% of all cluster 5 topics)
- > 688 M€ out of 2 383 M€ (29% of cluster 5 budget)

standard topics

Co-programmed Partnerships:

CCAM

- ZZERO
- Batt4EU
- Built4People

ZEWT





Number of topics per area

New elements in 2023-2024

Blind evaluation:

- Only in the first stage of the two-stages topics.
- <u>Objective</u>: to ensure a non-biased assessment of the basic ideas underpinning the proposal outlines
- Assessment of the blind evaluation at the end of Horizon Europe
- <u>Instructions for applicants</u>: Make sure that there are no indirect references to the participants of the consortium. May lead to disqualification.



Why do we use lump sum funding?

Significant simplification potential

- Lump sums remove the obligation to report actual costs and resources
- Easier to use for beneficiaries with limited experience
- Funding based on reimbursement of real costs remains complex and error-prone. Little scope for further simplification

Focus on content

• Focus less on financial management and more on content

Reducing the financial error rate

- Following the ECA annual reports 2019 and 2020, there is wide agreement that the error rate in the R&I Framework Programmes must be reduced
- Lump sums are a key measure to achieve this in Horizon Europe



Why do we use lump sum funding?

Easier access to the programme

- Very small share of beneficiaries have more than 100 grants:
 - Large entities
 - Dedicated staff and procedures to deal with actual costs
- Vast majority of beneficiaries have only 1 or 2 grants per programme
 - Most of them SMEs or newcomers
 - Little or no previous experience
 - Need a simple funding model



all beneficiaries of which SMEs or newcomers



Basic principles

• Lump sum grants follow the standard approach as much as possible

same: templates, evaluation criteria, payment scheme, technical reporting

- One lump sum share per work package and beneficiary
- Very simple financial reporting
- Lump sum shares paid upon completion of work packages



Writing a lump sum proposal

- To write a lump sum proposal, applicants:
 - Use the standard Horizon Europe application form
 - Present the objectives and methodology of their project and address the expected outcomes and impacts as in any Horizon Europe proposal
 - Describe in detail the activities covered by each work package.
- To define and justify the lump sum, applicants must provide a detailed budget table with cost estimations for <u>each cost category per beneficiary</u> (and affiliated entity if any) <u>and</u> <u>per work package</u>
- The cost estimations are used to generate in the detailed budget table a breakdown of lump sum shares per work package and per participant
- The detailed budget table is an **Excel file**. Applicants download it from the online submission system, fill it and submit it as an annex to the Part B application form.
- For further guidance: One dedicated lump sum page on the Funding & Tenders Portal



Evaluation of a lump sum proposal

- Your proposal will be evaluated by independent experts against the **standard evaluation criteria**: excellence, impact, and implementation.
- The cost estimations will be assessed against the proposed activities under the **implementation** criterion.
- Experts will:
 - ensure that the cost estimations are **reasonable and non-excessive**
 - evaluate whether the proposed resources and the split of the lump sum **allow completing the activities described in the proposal**.
- If the experts find overestimated costs, they make **concrete recommendations** on the budget that are recorded in the Evaluation Summary Report. This will be reflected in a modified lump sum amount in the grant agreement.
- Cost estimations that are clearly overestimated or underestimated lead to a **decreased score** under the implementation criterion.



Cluster 5 call structure 2023-2024

	1	/12/2022	2/03/2023	1/06/2023	31/08/2023	30/11/2023	29/02/2024	30/05/2024	29/08/2024
Climate sciences	HORIZON-CL5-2023-D1-0)1 13/12	2/2022 – 18/04/2023						
	HORIZON-CL5-2023-D1-0)1 13/12	2/2022 – 18/04/2023						
	HORIZON-CL5-2024-D1-0)1			12	2/09/2023 – 05/03/202	24		
Cross-cutting actions	HORIZON-CL5-2023-D2-0	13/12	2/2022 – 18/04/2023						
	HORIZON-CL5-2023-D2-0)2		04/05/2023 -	05/09/2023				
	HORIZON-CL5-2024-D2-0)1				07/12/2	2023 – 18/04/2024		
	HORIZON-CL5-2024-D2-0)2						07/05/2024 -	05/09/2024
	HORIZON-CL5-2023-D3-0)1 13/12/	2022 - 30/3/2023						
En aray ayonly	HORIZON-CL5-2023-D3-0)2		04/05/2023 -	05/09/2023				
Energy supply	HORIZON-CL5-2023-D3-0)3		04/05/2023 -	10/10/2023				
	HORIZON-CL5-2024-D3-()1			12/0	9/2023 – 16/01/2024			
	HORIZON-CL5-2024-D3-0)2						07/05/2024	05/09/2024
	HORIZON-CL5-2023-D4-0)1 13/12	2/2022 – 20/04/2023						
Energy use	HORIZON-CL5-2023-D4-()2		04/05/2023 -	05/09/2023				
	HORIZON-CL5-2024-D4-()1				07/12/2	2023 – 18/04/2024		
	HORIZON-CL5-2024-D4-()2						07/05/2024 -	05/09/2024
ustainable/ competitive	HORIZON-CL5-2023-D5-0)1 13/12	2/2022 – 20/04/2023						
transport	HORIZON-CL5-2024-D5-(-		07/12/2	2023 – 18/04/2024		
Mobility systems	HORIZON-CL5-2023-D6-0)1		04/05/2023 -	05/09/2023				
	HORIZON-CL5-2024-D6-0)1						07/05/2024	05/09/2024
			Ir	mplemented	d by CINE	4			European Commission



Thank you!

#HorizonEU

http://ec.europa.eu/horizon-europe



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CLUSTER 5 WORK PROGRAMME 2023-2024

Thematic areas





Destination 1 – Earth system science

Objectives

- Advancing knowledge about the Earth system
- Contributing to key international assessments, e.g. Intergovernmental Panel on Climate Change (IPCC)
- Increasing the transparency, robustness, trustworthiness and practical usability of the knowledge base on climate change



Issues covered in topics 2023-2024

 advanced science and technologies for analysing Earth system data, tipping points, cloud-aerosol interactions, role of hydrogen in the climate system, methane emissions and sinks, inland ice (cryosphere), paleoclimate, ecosystem-climate interactions

- 1 call in 2023 4 topics (total budget: 54 M€)
- 1 call in 2024 4 topics (total budget: 72 M€)



Destination 1 – <u>Climate change mitigation, pathways</u></u> to climate neutrality

Objectives

- Advancing solutions to reduce human interference with the climate system
- Contributing substantially to key **international assessments**, e.g. Intergovernmental Panel on Climate Change (IPCC)
- Increasing the transparency, robustness and relevance of the knowledge base on emission pathways, including integrated assessment models for use by policy makers, practitioners and citizens



Issues covered in topics 2023-2024

• Transition pathway analysis including NDCs, impacts of trade policies, climate foresight for raw material supply, voluntary climate change initiatives, 'blue carbon', including co-operation with China

- 2 calls in 2023 4 topics (total budget: 25.5 M€)
- 1 call in 2024 3 topics (total budget: 31 M€)



Destination 1 – <u>Adaptation to climate change, social</u> and behavioral science

Objectives

- Advancing knowledge on climate impacts
- Support better policy design and more effective implementation through behavioural insights
- Contributing to **international assessments**, e.g. Intergovernmental Panel on Climate Change (IPCC)
- Supporting the Mission on Adaptation



Issues covered in topics 2023-2024

• Modelling for local resilience, needs-based adaptation in Africa, behavioural change for systemic transformation, climate change education, governance of research on solar radiation modification

Implementation

1 call in 2023 – 5 topics (total budget: 38 M€)



Destination 2 – <u>A competitive and sustainable European</u> battery value chain

Objectives

- Nurture a world-class European research and innovation eco-system on batteries along the **value chain** based on sustainable pathways.
- Support the creation of a **competitive**, **circular**, **and sustainable European battery manufacturing value chain**

Issues covered in topics 2023-2024

 Raw material processing, advanced materials, recycling technologies, Liion batteries, solid state batteries, new generation technologies, manufacturing technologies, smart functionalities, testing, battery management, coordination activities

Implementation

- 2 calls in 2023 8 topics (total budget: 119 M€)
- 2 calls in 2024 7 topics (total budget: 101 M€)

All topics contribute to the coprogrammed Partnership BAtt4EU



Destination 2 – Emerging breakthrough technologies and climate solutions

Objectives

- Emergence of **unanticipated technologies** enabling emerging zerogreenhouse gas and negative emissions in energy and transport
- Development of high-risk/high return technologies to enable a transition to a net greenhouse gas neutral European economy
- Contribution to establishing a solid long-term dependable innovation in Europe.

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Issues covered in topics 2023-2024

 Energy distribution and transmission, long-term energy storage, novel energy generation/conversion methods

Implementation

1 call in 2024 – 1 topic (total budget: 10 M€)



Destination 2 – <u>Cross-cutting actions</u>

Objectives

- Contribution to the European Hydrogen strategy, development of an innovative hydrogen production technology, creation of an industrial ecosystem of green hydrogen production technology providers
- Bring demo systems to deployment stage, create synergies between different EU R&I funding programmes, contribute to the REPowerEU action plan and other EU climate targets.



Issues covered in topics 2023-2024

 Open Pilot Line/Test Bed for hydrogen; Support for the deployment of R&I results for climate mitigation (synergies with the ETS Innovation Fund)

Implementation

1 call in 2023 – 2 topics (total budget: 14 M€)



Destination 2 – <u>Communities and cities</u>

Objectives

- Enable the EU to achieve targets set out by the European Green Deal and fulfil its commitments related to the UN Agenda 2030, the Urban Agenda for the EU, the Habitat III New Urban Agenda and the Paris Agreement.
- European cities need to engage urgently in sustainability and climateneutrality transitions.



Issues covered in topics 2023-2024

 sustainable urban development (enhanced multi-level R&I cooperation, strengthen Europe as a role model), inclusive urban governance, policy and decision-making, local actors' engagement and empowerment

Implementation

1 call in 2023 – 1 topic (total budget: 37 M€)

This area is dedicated to the cofunded partnership **Driving Urban** Transition



Destination 3 – Global leadership in renewable energy

Objectives

- Foster European global leadership in affordable, secure and sustainable renewable energy technologies and services by improving their competitiveness in global value chains and their position in growth markets
- Diversify EU gas supplies and reduce the EU's dependence on fossil fuels following the RePowerEU action plan

Issues covered in topics 2023-2024

- Renewable valleys, solar energy, wind energy, ocean energy, hydro energy, biofuels, bioenergy, synthetic renewable fuels, geothermal energy, CHP, storage
- Disruptive technologies, cost reduction, improved efficiency, de-risking, integration, export potential, market uptake

Implementation

- 2 calls in 2023 24 topics (total budget: 339 M€)
- 2 calls in 2024 20 topics (total budget: 266 M€)



This area includes the co-funded partnership **Clean Energy Transition**



Destination 3 – Energy systems, grid & storage

Objectives

- Increased resilience, flexibility and stability of the energy system for high penetration of variable renewables and other new low carbon energy supply
- Innovative data-driven services for consumers that empower them to engage in the energy transition
- Development of cyber-security and privacy tools and technologies tailor-made for the energy system



Issues covered in topics 2023-2024

• Energy sector integration; energy system planning and operation; grid resilience and reliability; power electronics; active consumer; markets and energy communities; digitisation; thermal energy storage

- 2 calls in 2023 14 topics (total budget: 193 M€)
- 1 call in 2024 7 topics (total budget: 88 M€)



Destination 3 – <u>Carbon Capture, Utilisation and Storage</u> (CCUS)

Objectives

- Accelerating the development of Carbon Capture, Use and Storage (CCUS) as a CO2 emission mitigation option in electricity generation and industry applications
- Accelerated rollout of infrastructure for CCUS hubs and clusters
- Reduced cost of the CCUS value chain



Issues covered in topics 2023-2024

• CCU for the production of fuels, CO2 removal/negative emissions, CO2 transport and storage

- 1 call in 2023 1 topic (total budget: 40 M€)
- 1 call in 2024 2 topics (total budget: 30 M€)



Destination 4 – <u>Highly energy-efficient and climate</u> neutral EU building stock

Objectives

- Support EU ambition on energy efficiency and independence, with a stronger link between innovation in technology and practices, policy drivers and instruments
- Technological and socio-economic breakthroughs for achieving climate neutrality and the transition to zero pollution of the building stock by 2050, based on inclusive and people-centric R&I

Issues covered in topics 2023-2024

 Energy performance assessment and monitoring, industrialisation of deep renovation, integrated technology solutions, prefabricated renovation packages, demand response, renewable intensive homes, smart buildings, design, materials, sustainability of life-cycle

Implementation

- 2 calls in 2023 10 topics (total budget: 102 M€)
- 2 calls in 2024 7 topics (total budget: 70 M€)



Many topics contribute to the co-programmed partnership Built4People



Destination 4 – Industry

Objectives

 Increased energy efficiency in industry and reducing industry's Greenhouse Gas (GHG) and air pollutant emissions through recovery, upgrade and/or conversion of industrial excess (waste) heat and through electrification of heat generation.

Issues covered in topics 2023-2024

 Integration of renewable heat or industrial waste heat in heat-to-cold conversion systems to generate cold for industrial processes; Alternative heating systems for efficient, flexible and electrified heat generation in industry

- 1 call in 2023 1 topic (total budget: 20 M€)
- 1 call in 2024 1 topic (total budget: 16 M€)





Destination 5 – <u>Zero-emission road transport</u>

Objectives

 Transforming road transport to zero-emission mobility through a world-class European research and innovation and industrial system, ensuring that Europe remains world leader in innovation, production and services in relation to road transport (more detailed information below).



Issues covered in topics 2023-2024

 User-centric design, battery system managenemnt and integration, circular economy approaches, power electronics, optimised smart EV charging, heavy duty/light commercial vehicles, advanced digital tools and softwares

Topics contribute to the coprogrammed partnership 2ZERO

- 1 call in 2023 6 topics (total budget: 60 M€)
- 1 call in 2024 6 topics (total budget: 77 M€)



Destination 5 – Aviation

Objectives

 Accelerating the reduction of all aviation impacts and emissions (CO₂ and non-CO₂, including manufacturing and end-of-life, noise), developing aircraft technologies for deep reduction of greenhouse gas emissions, and maintaining European aero-industry's global leadership position



Issues covered in topics 2023-2024

• Hydrogen-powered aviation, electrified aviation, digital aviation technologies, advanced materials, flying test-bed

Complementary substantial activities are funded under the Institutional European Partnerships Clean Aviation and Air Traffic Management

- 1 call in 2023 4 topics (total budget: 54 M€)
- 1 call in 2024 4 topics (total budget: 57 M€)



Destination 5 – Waterborne transport

Objectives

 Accelerate the development and prepare the deployment of climate neutral and clean solutions in the shipping sector, reduce its environmental impact (on biodiversity, noise, pollution and waste management), improve its system efficiency, leverage digital and EU satellite-navigation solutions and contribute to the competitiveness of the European waterborne sector



Issues covered in topics 2023-2024

 climate neutral fuels, electrification, integrated digital solutions, reduction of shipping environmental impact, automated shipping, inland waterway vessels, business and industrial models, harmonisation of national policies

Most topics contribute to the co-programmed partnership **ZEWT**



- 1 call in 2023 7 topics (total budget: 93 M€)
- 1 call in 2024 7 topics (total budget: 61 M€)

Destination 5 – <u>Transport-related health and environement</u>

Objectives

 Devising more effective ways for reducing emissions and their impacts through improved scientific knowledge



Issues covered in topics 2023-2024

• Advanced transport emissions monitoring networks, assessment of air pollutant emissions from lowcarbon fuels in the heavy-duty, aviation, and maritime sectors

- 1 call in 2023 1 topic (total budget: 10 M€)
- 1 call in 2024 1 topic (total budget: 7 M€)



Destination 6 – <u>Connected, cooperative and automated</u> mobility

Objectives

 Accelerating the implementation of innovative connected, cooperative and automated mobility (CCAM) technologies and systems for passengers and goods

Issues covered in topics 2023-2024

 On-board perception and decision-making technologies; safety validation; Physical and Digital Infrastructure; cyber-security; socioeconomic and environmental impacts; coordination; demonstrators; occupant protection; human behavioural model; fleet and traffic management systems; Artificial Intelligence

Implementation

- 1 call in 2023 5 topics (total budget: 50 M€)
- 1 call in 2024 5 topics (total budget: 52 M€)



All topics contribute to the co-programmed Partnership **CCAM**



Destination 6 – <u>Multimodal transport, infrastructure &</u> <u>logistics</u>

Objectives

 Further developing a multimodal transport system through sustainable and smart long-haul and urban freight transport and logistics, upgraded and resilient physical and digital infrastructures for smarter vehicles and operations, for optimised system-wide network efficiency

Issues covered in topics 2023-2024

 Zero-emission e-commerce and freight delivery, operational automation to support multimodal freight transport; urban logistics and planning; climate resilient and safe maritime ports, optimisation of multimodal network and traffic management, logistics networks, improved transport infrastructure performance through digital tools, transport and mobility-related governance and policies

- 1 call in 2023 4 topics (total budget: 31 M€)
- 1 call in 2024 4 topics (total budget: 48 M€)





Destination 6 – <u>Safety and resilience</u>

Objectives

• Drastically decreasing the number of **transport accidents, incidents and fatalities** towards the EU's long-term goal of moving close to zero fatalities and serious injuries by 2050 even in road transportation (Vision Zero) and increase the **resilience** of transport systems.

Issues covered in topics 2023-2024

 Infrastructure safety on rural roads, aviation safety, reduction of injuries and long-term consequences in road crashes, safety, resilience and security of waterborne digital systems, societal impacts of disruptive changes in transport, traffic safety improvement in the EU, reduced energy dependancy of transport

- 1 call in 2023 3 topics (total budget: 26 M€)
- 1 call in 2024 3 topics (total budget: 22 M€)





Cluster 5 Info Days & Brokerage Event

- Cluster 5 Info Days online (15/16 December):
- The recordings of the sessions, together with the related PPTs are available on the event's website. In order to access the presentations, please click on **"Show details"** on the respective session's page:
- <u>Events | The research and innovation community platform</u> (europa.eu)



Show details 🗸

- Cluster 5 NCP project pitching session online (16 December):
- The PPT of the projects' ideas presented are available at: <u>https://greenet-brokerage-event-</u> <u>2023.b2match.io/page-4481</u>





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