Horizon Europe
Funding opportunities

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HORISONTTI EUROOPPA
EU:N TUTKIMUS- JA INNOVAATIO-OHJELMA

Horizon Europe
The largest RDI programme in the world

✓Horizon Europe 2021-2027: 95 billion €

International collaboration projects

Funded themes:

- ✓ Health
- ✓ Culture, creativity and inclusive society
- ✓ Civil security for society
- ✓ Digital, industry and space
- ✓ Climate, energy and mobility
- ✓ Food, bioeconomy, natural resources, agriculture and environment

- ✓ All kinds of legal entities from all over the world
- ✓ Mainly for collaborative international RDI projects (single companies: EIC Accelerator)
- ✓ Calls launched mainly 1-2 times a year
- ✓ Grants also for higher TRL levels closer to market
- ✓ Grants mainly 70-100 %
- ✓ Evaluation in Brussels
- ✓ No minimum or maximum limit to funding, average 2-10M€ per consortium

Why should you be interested?

Not just the money but

- ✓ Developing a solution together with potential customer, opening up markets already at development stage, access and entry to international value chains
- ✓ Implementing large and risky RDI projects, pilots and demonstrations with international partners
- ✓ Making use of the best expertise in Europe

…but the foundation is built at national level

- ✓ BF funding suitable for developing own technology, competence and international competitiveness and building networks and collaboration in Finland
- ✓ International networking should be started already in national level projects as they will be needed sooner or later

Horizon Europe 2021 - 2027

Pillar 1
Excellent Science

- European Research Council
- Marie Skłodowska-Curie Actions
- Research Infrastructures

Pillar 2
Global Challenges and European Industrial Competitiveness

Clusters
- Health
- Culture, Creativity and Inclusive Society
- Civil Security for Society
- Digital, Industry and Space
- Climate, Energy and Mobility
- Food, Bioeconomy, Natural Resources, Agriculture and Environment

- Joint Research Centre

Pillar 3
Innovative Europe

- European Innovation Council
- European innovation ecosystems
- European Institute of Innovation and Technology

Widening Participation and Strengthening the European Research Area

- Widening participation and spreading excellence
- Reforming and Enhancing the European R&I system

Horizon Europe Cluster 5 Destinations 2023-2024

D1: Climate sciences and responses for the transformation towards climate neutrality

- Earth system science
- Climate change mitigation
- Climate change adaptation
- Social, citizen and behavioural science

D2: Cross-sectoral solutions for the climate transition

- A competitive and sustainable European battery value chain

D3: Sustainable, secure and competitive energy supply

- Global leadership in renewable energy
- Energy systems, grids & storage

D4: Efficient, sustainable and inclusive energy use

- Highly energy-efficient and climate neutral European building stock

D5: Clean and competitive solutions for all transport modes

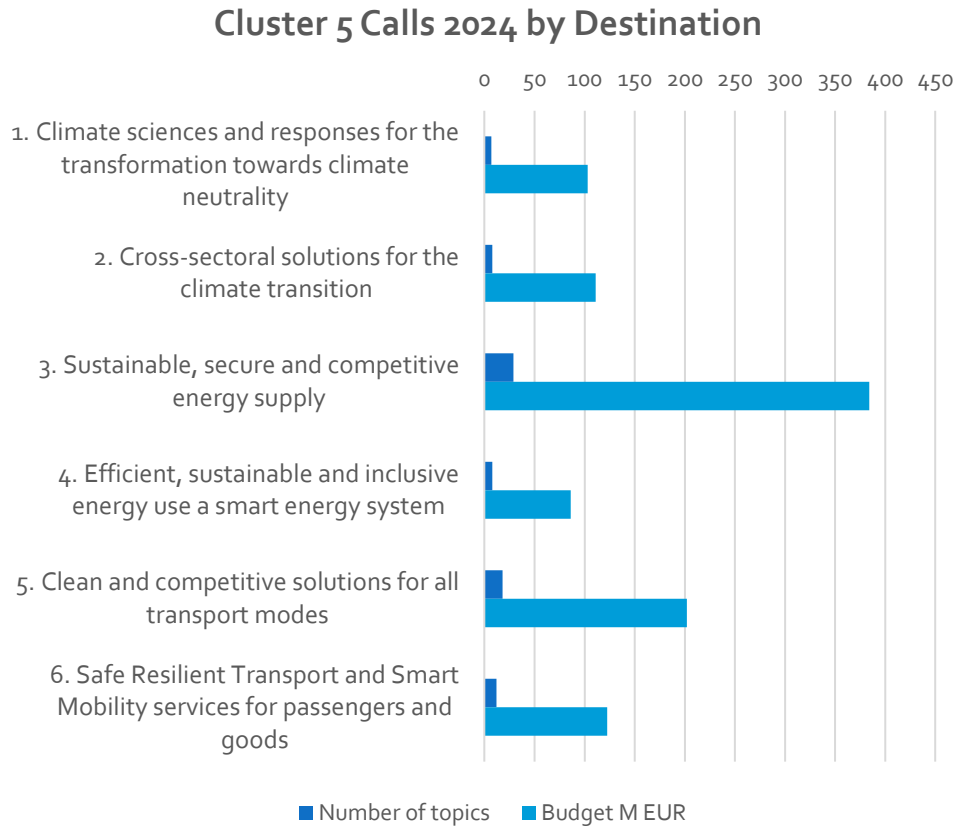
- Zero-emission road transport
- Aviation
- Waterborne transport
- Rail Industry (EU-Rail)

D6: Safe, Resilient Transport and Smart Mobility services for passengers and goods

- Connected, Cooperative and Automated Mobility (CCAM)
- Multimodal transport, infrastructure and logistics
- Innovative digital tools and solutions to monitor and improve the management and operation of transport infrastructure
- Safety and resilience

CL5 calls 2024: Number of topics and budget

DESTINATIONS	Number of topics	Budget M EUR
1. Climate sciences and responses for the transformation towards climate neutrality	7	103
2. Cross-sectoral solutions for the climate transition	8	111
3. Sustainable, secure and competitive energy supply	29	384
4. Efficient, sustainable and inclusive energy use a smart energy system	8	86
5. Clean and competitive solutions for all transport modes	18	202
6. Safe Resilient Transport and Smart Mobility services for passengers and goods	12	122,5
Total	**82**	**1008,5**



Destination 2: Overview of the 2024 Horizon Europe Calls for Cross-sectoral solutions for the climate transition

HORISONTTI EUROOPPA

EU:N TUTKIMUS- JA INNOVAATIO-OHJELMA

HORIZON-CL5-2024-D2-01 & HORIZON-CL5-2024-D2-02

- Opening on 7 Dec 2023 – Closing 18 Apr 2024 (5 topics)
- Opening on 7 May 2024 – Closing 5 Sep 2024 (3 topics)
- The total indicative budget is about 111 EUR million
- RIAs 5 topics
- IAs 3 topics

- The indicative total budgets of the topics vary from 5 million euros to 21 million euros.
- The expected number of projects to be funded ranges from 1 to 5 per topic

You can find the more details about these calls on the Funding & Tenders Portal

Topics 2024 for destination 2

Topic Identifier	Topic	Type of Action	Topic Budget (mio.)	Number of projects to be funded	Opening Date	Closing Date	Other
HORIZON-CL5-2024-D2-01-01	**Advanced sustainable and safe pre-processing technologies for End-of-Life (EoL) battery recycling** (Batt4EU Partnership)	RIA	€ 16,00	2	7.12.2023	18.4.2024	TRL 5 by the end of the project
HORIZON-CL5-2024-D2-01-02	**Non-Li Sustainable Batteries with European Supply Chains for Stationary Storage** (Batt4EU Partnership)	IA	€ 21,00	3	7.12.2023	18.4.2024	Lump Sum, funding rate 60% except for non-profits, TRL 6-7 by the end of the project
HORIZON-CL5-2024-D2-01-03	Development of **technical and business solutions to optimise the circularity, resilience, and sustainability of the European battery value chain** (Batt4EU Partnership)	RIA	€ 5,00	1	7.12.2023	18.4.2024	TRL 5 by the end of the project
HORIZON-CL5-2024-D2-01-04	**Emerging energy technologies** for a climate neutral Europe	RIA	€ 10,00	5	7.12.2023	18.4.2024	TRL 3-4 by the end of the project
HORIZON-CL5-2024-D2-01-05	Furthering the **development of a materials acceleration platform for sustainable batteries** (combining AI, big data, autonomous synthesis robotics, high throughput testing) (Batt4EU Partnership)	RIA	€ 20,00	1	7.12.2023	18.4.2024	TRL 4 by the end of the project
HORIZON-CL5-2024-D2-02-01	**Sustainable high-throughput production processes for stable lithium metal anodes** for next generation batteries (Batt4EU Partnership)	IA	€ 8,00	1	7.5.2024	5.9.2024	TRL 6-7 by the end of the project, funding rate 60% except for non-profits
HORIZON-CL5-2024-D2-02-02	**Post-Li-ion technologies and relevant manufacturing techniques for mobility applications** (Generation 5) (Batt4EU Partnership)	RIA	€ 15,00	3	7.5.2024	5.9.2024	TRL 4 by the end of the project
HORIZON-CL5-2024-D2-02-03	**Size & weight reduction of cell and packaging of batteries system**, integrating lightweight and functional materials, innovative thermal management and safe and sustainable by design approach (Batt4EU Partnership)	IA	€ 16,00	2	7.5.2024	5.9.2024	TRL 6-7 by the end of the project

Destination 5: Overview of the 2024 Horizon Europe Calls for Clean and competitive solutions for all transport modes

Online
17 October 2023
11:15-12:30, 12:45-14:00, 16:30-17:45 (GMT+03:00)

Markku Pekonen, NCP, Business Finland

HORISONTTI EUROOPPA
EU:N TUTKIMUS- JA INNOVAATIO-OHJELMA

HORIZON-CL5-2024-D5-01

- Opening on 7 December 2023 and closing 18 April 2024
- The total indicative budget is 202 EUR million
- The call has 18 topics, which support 3 types of actions:
  - RIAs 9 topics
  - IAs 7 topics
  - CSAs 2 topics
- The indicative total budgets of the call topics vary from 0,85 million euros to 21 million euros
- The expected number of projects to be funded ranges from 1 to 5 per call topic

You can find the more details about these calls on the Funding & Tenders Portal

Topics 2024 for destination 5

Topic Identifier	Topic	Type of Action	Topic Budget (m)	Number of projects to be funded	Opening Date	Closing Date	Other
HORIZON-CL5-2024-D5-01-01	**Smart, low-cost pervasive stationary slow charging and bi-directional solutions** synergic with the grid for EV mass deployment (2ZERO Partnership)	IA	€ 15,00	2	7.12.2023	18.4.2024	Funding rate 60% except for non-profits, TRL7-8 by the end of the project
HORIZON-CL5-2024-D5-01-02	Integration and testing of next **generation post 1200V electric powertrains** (2ZERO Partnership)	RIA	€ 15,00	3	7.12.2023	18.4.2024	TRL 5 by the end of the project
HORIZON-CL5-2024-D5-01-03	**Advanced battery system integration** for next generation vehicles (2ZERO Partnership)	RIA	€ 10,00	2	7.12.2023	18.4.2024	TRL 5 by the end of the project
HORIZON-CL5-2024-D5-01-04	**Integrated flexible multipoint megawatt charging systems** for electric truck mass deployment (2ZERO Partnership)	IA	€ 17,00	2	7.12.2023	18.4.2024	TRL 8 by the end of the project
HORIZON-CL5-2024-D5-01-05	**Advanced digital development tools** to accelerate the development of software defined vehicles that enable zero-emission mobility (2ZERO Partnership)	RIA	€ 10,00	2	7.12.2023	18.4.2024	TRL 4-5 by the end of the project
HORIZON-CL5-2024-D5-01-06	**New designs, shapes, functionalities of Light Commercial Vehicles** (2ZERO Partnership)	IA	€ 10,00	1	7.12.2023	18.4.2024	TRL7-8 by the end of the project
HORIZON-CL5-2024-D5-01-07	Accelerating **climate neutral aviation**, minimising non-CO2 emissions	RIA	€ 17,00	4	7.12.2023	18.4.2024	TRL 2-4 by the end of the project

Topics 2024 for destination 5

Topic Identifier	Topic	Type of Action	Topic Budget (m)	Number of projects to be funded	Opening Date	Closing Date	Other
HORIZON-CL5-2024-D5-01-08	**Competitiveness and digital transformation in aviation** – advancing further composite aerostructures	RIA	€ 21,00	5	7.12.2023	18.4.2024	Lump sum, TRL 2-4 by the end of the project
HORIZON-CL5-2024-D5-01-09	**Impact monitoring of EU Aviation R&I**	RIA	€ 3,00	1	7.12.2023	18.4.2024	
HORIZON-CL5-2024-D5-01-10	Towards **a flying testbed** for European leadership **in aviation**	RIA	€ 16,00	1	7.12.2023	18.4.2024	TRL 4-5 by the end of the project
HORIZON-CL5-2024-D5-01-11	Achieving high voltage, low weight, efficient **electric powertrains for sustainable waterborne transport** (ZEWT Partnership)	RIA	€ 15,00	2	7.12.2023	18.4.2024	TRL 5 by the end of the project
HORIZON-CL5-2024-D5-01-12	Combining state-of-the-art **emission reduction and efficiency improvement technologies in ship design** and retrofitting for contributing to the "Fit for 55" package objective by 2030 (ZEWT Partnership)	IA	€ 15,00	2	7.12.2023	18.4.2024	Funding rate 60% except for non-profits

Topics 2024 for destination 5

Topic Identifier	Topic	Type of Action	Topic Budget (m)	Number of projects to be funded	Opening Date	Closing Date	Other
HORIZON-CL5-2024-D5-01-13	Demonstration of Technologies to **minimise underwater noise** generated by waterborne transport (ZEWT Partnership)	IA	€ 6,00	1	7.12.2023	18.4.2024	TRL 6-8 by the end of the project
HORIZON-CL5-2024-D5-01-14	Demonstrating efficient **fully DC electric grids within waterborne transport** for large ship applications (ZEWT Partnership)	IA	€ 15,00	2	7.12.2023	18.4.2024	Funding rate 60% except for non-profits
HORIZON-CL5-2024-D5-01-15	Advanced **digitalisation and modelling utilizing operational and other data** to support zero emission waterborne transport (ZEWT Partnership)	IA	€ 7,70	1	7.12.2023	18.4.2024	TRL 6-7 by the end of the project
HORIZON-CL5-2024-D5-01-16	Structuring the Waterborne transport sector, including through **changed business and industrial models** in order to achieve commercial zero-emission waterborne transport (ZEWT Partnership)	CSA	€ 0,85	1	7.12.2023	18.4.2024	Lump sum
HORIZON-CL5-2024-D5-01-17	**Coordinating and supporting the combined activities of member and associated states towards the objectives of the Zero Emission Waterborne Transport partnership** so as to increase synergies and impact (ZEWT Partnership)	CSA	€ 1,50	1	7.12.2023	18.4.2024	Lump sum
HORIZON-CL5-2024-D5-01-18	**Assessment of air pollutant emissions** from low-carbon fuels **in the heavy-duty, aviation, and maritime sectors**	RIA	€ 7,00	2	7.12.2023	18.4.2024	TRL 5-6 by the end of the project

Destination 6: Overview of the 2024 Horizon Europe Calls for Safe Resilient Transport and Smart Mobility services for passengers and goods

Online
17 October 2023
11:15-12:30, 16:30-17:45 (GMT+03:00)

Markku Pekonen, NCP, Business Finland

HORISONTTI EUROOPPA
EU:N TUTKIMUS- JA INNOVAATIO-OHJELMA

HORIZON-CL5-2024-D6-01

- Opening on 7 May 2024, closing on 5 September 2024
- The total indicative budget is 122,5 EUR million
- 8 RIAs
- 3 IAs
- 1 CSA

- The indicative total budgets of the topics vary from 3 million euros to 20 million euros.
- The expected number of projects to be funded ranges from 1 to 3 per topic.

You can find the more details about these calls on the Funding & Tenders Portal

Topics 2024 for destination 6

Topic Identifier	Topic	Type of Action	Topic Budget (m)	Number of projects to be funded	Opening Date	Closing Date	Other
HORIZON-CL5-2024-D6-01-01	Centralised, reliable, cyber-secure & upgradable **in-vehicle electronic control architectures for CCAM connected to the cloud-edge continuum** (CCAM Partnership)	RIA	€ 12,00	2	7.5.2024	5.9.2024	TRL 5 by the end of the project
HORIZON-CL5-2024-D6-01-02	**Scenario-based safety assurance of CCAM** and related HMI in a dynamically evolving transport system (CCAM Partnership)	RIA	€ 14,00	1	7.5.2024	5.9.2024	TRL 5 by the end of the project
HORIZON-CL5-2024-D6-01-03	**Orchestration of heterogeneous actors in mixed traffic** within the CCAM ecosystem (CCAM Partnership)	IA	€ 12,00	2	7.5.2024	5.9.2024	TRL 6-7 by the end of the project
HORIZON-CL5-2024-D6-01-04	**AI for advanced and collective perception and decision making** for CCAM applications (CCAM Partnership)	RIA	€ 10,00	2	7.5.2024	5.9.2024	TRL 5 by the end of the project
HORIZON-CL5-2024-D6-01-05	Robust Knowledge and Know-How transfer for **Key-Deployment Pathways and implementation of the EU-CEM** (CCAM Partnership)	CSA	€ 4,00	1	7.5.2024	5.9.2024	Lump sum
HORIZON-CL5-2024-D6-01-06	**Optimising multimodal network and traffic management**, harnessing data from infrastructures, mobility of passengers and freight transport	RIA	€ 10,00	2	7.5.2024	5.9.2024	TRL 5 by the end of the project

Topics 2024 for destination 6

Topic Identifier	Topic	Type of Action	Topic Budget (m)	Number of projects to be funded	Opening Date	Closing Date	Other
HORIZON-CL5-2024-D6-01-07	**Scaling up logistics innovations supporting freight transport decarbonisation** in an affordable way	IA	€ 20,00	2	7.5.2024	5.9.2024	TRL 7 by the end of the project
HORIZON-CL5-2024-D6-01-08	Improved transport infrastructure performance – **Innovative digital tools and solutions to monitor and improve** the management and operation of **transport infrastructure**	IA	€ 15,00	3	7.5.2024	5.9.2024	TRL 7 by the end of the project
HORIZON-CL5-2024-D6-01-09	**Policies and governance** shaping the future **transport and mobility systems**	RIA	€ 3,00	1	7.5.2024	5.9.2024	Lump sum
HORIZON-CL5-2024-D6-01-10	Ensuring the **safety, resilience and security of waterborne digital systems**	RIA	€ 8,50	2	7.5.2024	5.9.2024	TRL 5-6 by the end of the project
HORIZON-CL5-2024-D6-01-11	**Effects of disruptive changes in transport**: towards resilient, safe and energy efficient mobility	RIA	€ 7,00	2	7.5.2024	5.9.2024	Lump sum
HORIZON-CL5-2024-D6-01-12	A new **framework to improve traffic safety culture** in the EU	RIA	€ 7,00	2	7.5.2024	5.9.2024	Lump sum

LAAJOJEN HORISONTTI- JA EDF-PROJEKTIEN VALMISTELUN RAHOITUS YRITYKSILLE

Sari Federley

sari.federley (at) businessfinland.fi

Tel. 040 546 4141

Kenelle?

Yrityksille,

- Jotka ovat mukana **laajan konsortioprojektin** valmistelussa, ja jossa suomalaiskumppanille on tulossa merkittävä rooli
- joiden henkilöstö Suomessa on vähintään 2 htv (yhden oltava kokoaikainen)
- jotka eivät ole EU-määritelmän mukaisesti vaikeuksissa olevia
- joilla on taseessaan nettorahoitusvaroja vähintään valmisteluprojektin kokonaiskustannusten verran
- joiden **de minimis -kiintiössä on tilaa** (hakijayritys ja samaan konserniin tai määräysvaltaan kuuluvat suomalaisyritykset)
    - Yritys voi saada de minimis -tukea enintään 200.000 euroa kuluvan ja kahden edellisen verovuoden aikana.

Rahoitus

- EU-projektin kokonaiskustannukset vähintään 3 M€
- Business Finland hyväksyy valmisteluvaiheen projektin kustannuksiksi enintään 5% tavoitellun projektin kyseisen osallistujan kokonaiskustannusten määrästä (esim. 1 M€ = 50 000 €)
- Business Finlandin rahoitusosuus on 75 % kustannuksista, enintään **60 000 €**
- Kustannuksia hyväksytään aikaisintaan siitä päivästä lähtien, kun hakemus on lähetetty Business Finlandiin
- Ennakkoa ei tässä rahoituspalvelussa makseta
- Kustannukset voi tilittää, kun EU-hakemus on arvioitu ja se on saavuttanut kussakin EU-ohjelmassa määritellyt kynnysarvot
    - Horisontti Eurooppa: 3 pistettä per arvioitu osio (Excellence, Impact, Implementation)

Hakemuksen rakentaminen ja valmistelu

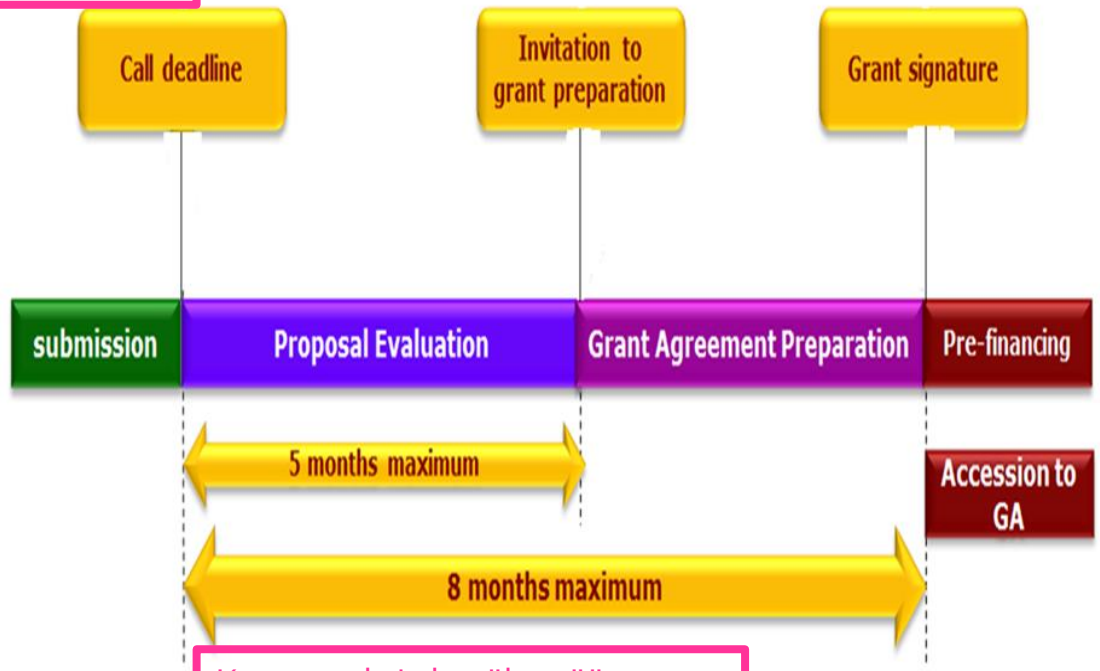
Jätä valmisteluraahoitushakemus Business Finlandille ”heti” kun sopiva hakutopic ja alustava konsortio on tiedossa – kustannuksia hyväksytään aikaisintaan siitä päivästä alkaen, kun hakemus on lähetetty meille!

Konsortio muodostuu ja uusia partnereita tulee mukaan

Idea → Sopivan rahoitushaun etsintä & valinta → Konseptin kehitys, projektointi → Hakemuksen valmistelu ja lähetys

Konsortio valitsee joukostaan koordinaattorin, joka johtaa valmistelua

Roolit, vastuut ja budjettijako sovitaan partnerien kesken



Kustannuksia hyväksytään 6 kk deadlinen jälkeen, esim. konsortiosopimuksen laadintaan

Kiitos!

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www.horisonttieurooppa.fi

@Eutifi

HorisonttiEU

CLUSTER 5 Climate, Energy, Mobility

Destination 2

Cross-sectoral solutions for the climate transition

European Commission

Thematic area

Emerging breakthrough technologies and climate solutions

Carla BENAUGES
DG CLIMA

European Commission

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

SCOPE

- This topic focusses on the development of **novel bottom-up technological solutions with breakthrough potential** across all parts of the **energy sector value chain**, as well as all energy-related aspects in the **transport sector**.

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.

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

EXPECTED OUTCOMES

- Demonstration of knowledge and scientific proofs of the technological feasibility of concepts on high risk/high return (i.e. high technological and economic risks) technologies for transition to climate neutral economy by 2050 and beyond.

- Assessment of environmental, social, and economic benefits to contribute to R&I strategy, as well as the EU climate and energy targets.

- Contribution to establishing a solid long-term dependable innovation in Europe.

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

TYPE OF ACTION

- **RIA –** Research & Innovation Action
- Expected **TRL 4** by the end of the project

EU CONTRIBUTION

- Per project: between **1.5 and 2.5 M€**
- Total: **10 M€**

TIMING

- Call opening: **7 Dec 2023**
- Call closing: **18 April 2024**

- *This topic does not cover renewable energy technologies covered under D3-1-49 and batteries covered under D3-01-13 as well as material research*
- *The proposal should adress barriers to deployment of such technologies and ensure it has low-environmental impact*

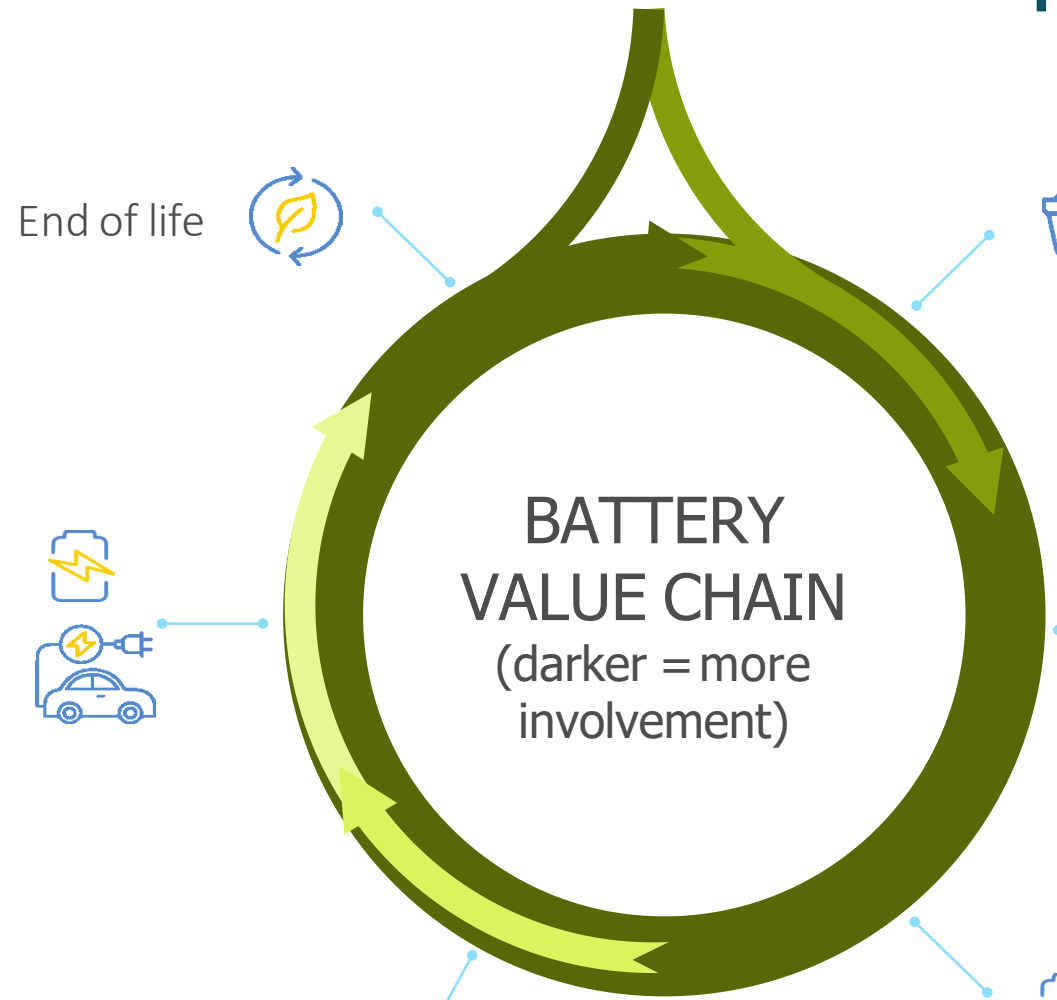
Thematic area

Batteries

Johan BLONDELLE
DG RTD

European Commission

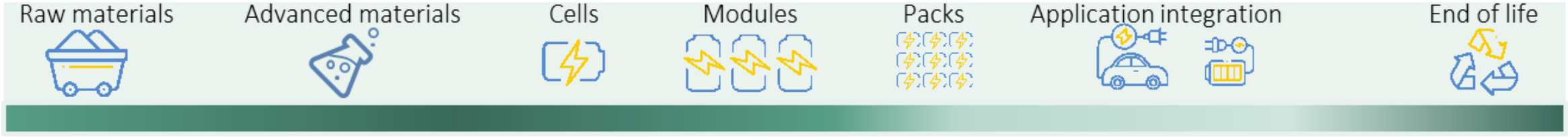
Topics under Batt4EU Partnership



Partnerships dedicated to applications will lead the downstream R&I segments activities

Scope of the Strategic R&I Agenda

3 focus areas to cover the segments of the value chain and 2 cross-cutting issues



AREA 1
Raw Materials and Recycling

AREA 2
Advanced Materials and Manufacturing

AREA 3
Battery end-uses and operations

AREA 1
Raw Materials and Recycling

CROSS CUTTING ISSUE 1 - Safety

CROSS CUTTING ISSUE 2 - Sustainability

CROSS CUTTING ISSUE 3 - Coordination

www.bepassociation.eu/sria

Battery Topics 2023

- All battery topics fall under Partnership Batt4EU
- Private side represented by Batteries European Partnership Association (BEPA), https://bepassociation.eu/
- Topic creation:
  - Co-creation group inside Commission
  - Collaboration European Technology & Innovation Platform (ETIP) Batteries Europe + Battery 2030+
  - Full inter-service consultation process + Member States consultation
  - Jointly agreed Strategic Research & Innovation Agenda
- No need to be a member of BEPA – calls are fully open
- NB: topic presentation not exhaustive – please refer to full call text!

https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/home

HORIZON-CL5-2024-D2-01-01
Advanced sustainable and safe pre-processing technologies for End-of-Life (EoL) battery recycling

SCOPE

- Develop and integrate new advanced pre-processing concepts that enable **more efficient and safe technologies** for recycling EoL LIBs.
- Substantial improvements should be achieved in the processes **environmental and economic viability and in the circular economy**
- Concepts to be addressed:
  - Battery sorting at component level, including standardisation of labelling of battery components
  - Advanced pre-processing methods to improve pre-concentration while minimizing waste
  - Process design for recovery and valorisation of anode materials
  - Electrolyte valorisation, recovery of Li salts
  - Separation of strategic battery materials, mitigate impurities
  - Recovery of electrode current collectors (Al and Cu)
  - Non-active materials (solvent, binders, separator…)
  - Life cycle sustainability, safety, techno-economical solutions

HORIZON-CL5-2024-D2-01-01
Advanced sustainable and safe pre-processing technologies for End-of-Life (EoL) battery recycling

EXPECTED OUTCOMES

- European economic base which is stronger, more resilient, competitive and fit for the green and digital transitions, by **reducing strategic dependencies for critical raw materials** by promoting a circular economy.
- Direction towards the **zero-waste concept** by developing holistic, materials and energy efficient recycling processes, increase the content of recovered mass, vertical integration strategy.
- Circularity of battery materials, where **also non-metallic elements** (electrolyte, solvent, salts and polymers) are recycled back to use.
- **Environmentally beneficial processes** for battery pre-treatment to decrease the CO2 footprint and other emissions.
- **Safe** technologies aimed at improved recovery yield, increased quality and purity level of the recycled/recovered materials, improved impurity removal.

HORIZON-CL5-2024-D2-01-01
Advanced sustainable and safe pre-processing technologies for End-of-Life (EoL) battery recycling

TYPE OF ACTION

- **RIA –** Research & Innovation Action
- Expected **TRL 5** by the end of the project

EU CONTRIBUTION

- Per project: **8 M€**
- Total: **16 M€**

TIMING

- Call opening: **7 Dec 2023**
- Call closing: **18 April 2024**

- *Build on CL5-2023-D2-01-02 – New processes for upcoming recycling feeds*
- *Link to CL5-2022-D2-01-08 – Battery 2030+ CSA*
- *Consider participation of JRC*

HORIZON-CL5-2024-D2-01-02
Non-Li Sustainable Batteries with European Supply Chains for Stationary Storage

SCOPE

- Develop + demonstrate sustainable and safe **non-Li battery solutions**, no CRM
- Energy density and power metrics suited to **stationary energy storage**
- Prove sustainability and compatibility with **EU supply chain**
- Demonstrably manage **toxicity and safety risks** to lowest possible level
- Encouraged to:
  - Improve techno-economic performance and/or ability to meet sustainability targets
  - Define tech & commercial targets + quantified criteria/KPIs to allow evaluation
  - Demonstrate credible commercial + technical path to product
  - Provide evidence of current + future sustainability, viable EU supply chains + analyses of sustainability and recyclability
  - Demonstrate minimal to no maintenance requirements
- **BMS development** in scope but not focus
- **Other applications** (motive?) encouraged
- Focus not on materials discovery, refinements of existing chemistries in scope

HORIZON-CL5-2024-D2-01-02
Non-Li Sustainable Batteries with European Supply Chains for Stationary Storage

EXPECTED OUTCOMES

- European economic base which is stronger, more resilient, competitive and fit for the green and digital transitions, by **reducing strategic dependencies for critical raw materials** by promoting a circular economy.
- Devt of post-Li chemistries suited for selected stationary energy storage
- Projected storage costs **<0,05€/kWh/cycle by 2030**, esp. for min storage durations up to 8 hours
- Route to EU-based supply chain, avoidance of CRM
- **Demonstration** in end-user conditions **at least 3000h**
- Projected **5000 cycle** life span
- Safe & efficient
- Concept for demonstrable, highly sustainable, circular manufacturing

HORIZON-CL5-2024-D2-01-02
Non-Li Sustainable Batteries with European Supply Chains for Stationary Storage

TYPE OF ACTION

- **IA –I**nnovation Action
- Expected **TRL 6-7** by the end of the project

EU CONTRIBUTION

- Per project: 7 **M€**
- Total: **21 M€**

TIMING

- Call opening: **7 Dec 2023**
- Call closing: **18 April 2024**

➢ *International cooperation with India, Africa and Australia encouraged*

HORIZON-CL5-2024-D2-01-03
Devt of technical and business solutions to optimise the circularity, resilience, and sustainability of the European battery value chain

SCOPE : at east 2 categories, 3 bullets in total of

- Business models:
  - Assessment approaches for **sustainable** business models
  - Methods for evaluation of cycle life options – **retrofit, 2nd life, recycle**
  - Devt of business **models + social innovations** promoting sustainable mobilisation of resources
  - Address outstanding issues, e.g. **liability**
- Cross-industry tools
  - Methodologies to decide between **second life or recycle** + at which level (pack, cell…)
  - Optimise design & operation using **LCA**
  - Devt of central data **info system & database** + prototype info system for **accident** vehicles
- Sustainable design
  - Battery **design & architecture** at all levels supporting dismantling + recycling
  - Improve sustainability, **processes** that avoid toxic/harmful solvents + controlled environments
  - R&D of batteries from **recycled materials**, fully recyclable

HORIZON-CL5-2024-D2-01-03
Devt of technical and business solutions to optimise the circularity, resilience, and sustainability of the European battery value chain

EXPECTED OUTCOMES

- European economic base which is stronger, more resilient, competitive and fit for the green and digital transitions, by **reducing strategic dependencies for critical raw materials** by promoting a circular economy.
- Advance **circular + sustainable** design + business practices
- Improve life cycle sustainability for batteries produced in EU
- Enhance EU **strategic independence, competitiveness**, maximise socio-economic benefits
- Support EU **recycling efficiency targets** for 2030 and beyond
- Optional:
  - Enabling tools + best practiced for multiple industry sectors
  - Improve batteries & their materials/components through more material efficient designs

HORIZON-CL5-2024-D2-01-03
Devt of technical and business solutions to optimise the circularity, resilience, and sustainability of the European battery value chain

TYPE OF ACTION

- **RIA –**Research & Innovation Action
- Expected **TRL 5** by the end of the project

EU CONTRIBUTION

- Per project: **5 M€**
- Total: **5 M€**

TIMING

- Call opening: **7 Dec 2023**
- Call closing: **18 April 2024**

- *Cooperation with complementary projects*
- *Link to CL5-2022-D2-01-08 – Battery 2030+ CSA*
- *Consider participation of JRC*

HORIZON-CL5-2024-D2-01-05

Furthering the development of a materials acceleration platform for sustainable batteries (AI, big data, autonomous synthesis robotics, high throughput testing)

SCOPE

- **Infrastructure tools** for secure remote data access, data analysis and predictive modelling: Findable, Accessible, Interoperable, Reusable data infrastructure
- **Automated high throughput characterisation** and integrated **experimental and computational** workflows: using standardised battery cells and protocols to perform screening of new materials
- **Autonomous synthesis robotics and orchestration** software: partially autonomous systems with standard synthesis routes + AI-based orchestration and optimization software
- **Inverse design and AI-assisted scale-bridging models** for multiple time- and length-scale processes: covering atomistic and mesoscopic processes, incorporating sensing data to estimate state of system + diagnosis and prediction

HORIZON-CL5-2024-D2-01-05

Furthering the development of a materials acceleration platform for sustainable batteries (AI, big data, autonomous synthesis robotics, high throughput testing)

EXPECTED OUTCOMES

- Develop new tools and methods for significantly **accelerating** the development and optimisation of battery **materials and interfaces**.
- Demonstrate a **fully autonomous battery-MAP** capable of integrating computational modelling, materials synthesis and characterisation of both **Li-ion and beyond Li-ion** chemistries.
- **Scale-bridging, multi-scale battery interface models** capable of integrating data from embedded sensors in the discovery and prediction process.
- Community wide state-of-the-art **collaborative environment** to access data and utilise automated workflows for integrated simulations and experiments on heterogeneous sites.
- **Demonstrate a robotic system** that is capable of material synthesis for inorganic, organic or hybrid compounds.
- Deploy **predictive hybrid physics- and data-driven models** for the spatio-temporal evolution of battery interfaces and **demonstrate inverse design** of a battery material/interface.

HORIZON-CL5-2024-D2-01-05

Furthering the development of a materials acceleration platform for sustainable batteries (AI, big data, autonomous synthesis robotics, high throughput testing)

TYPE OF ACTION

- **RIA –** Research & Innovation Action
- Expected **TRL 3-4** by the end of the project

EU CONTRIBUTION

- Per project: **20 M€**
- Total: **20 M€**

TIMING

- Call opening: **7 Dec 2023**
- Call closing: **18 April 2024**

➢ *Link to CL5-2022-D2-01-08 – Battery 2030+ CSA*

HORIZON-CL5-2024-D2-02-01
Sustainable high-throughput production processes for stable lithium metal anodes for next generation batteries

SCOPE

EU production chain for Li metal for Gen 4b, 4c and Gen 5

- Sustainable, cost-efficient and large-scale production of **Li-metal foils and/ or electrodes**, **demonstrated up to pilot level** during the project.
- Activities can include, but are not limited to, extrusion, comparison extrusion / electrostatic spray, rolling and co-rolling.
- However, extensive **cell design and development are out of the scope** as this topic focuses on the Li anode production.
- Control of the **passivation of Li metal films**, and to understand how the passivation is linked with the dry room conditions and requirements.
- Find the **optimal way**: high passivation and lower quality dry room, or low passivation and higher quality dry room, and how these selections are linked with cost, energy consumption and performance of the cells.
- Guarantee **safety of the Li film production and handling**, which has to be demonstrated in a process that is compatible for large scale production.

HORIZON-CL5-2024-D2-02-01
Sustainable high-throughput production processes for stable lithium metal anodes for next generation batteries

EXPECTED OUTCOMES

- Reduction of **strategic dependencies for critical raw materials** by promoting resource efficiency.
- **Energy consumption/carbon footprint** of processing 10% lower than SoA.
- Throughput of Li foil and/or electrode production to support cell manufacturing, including a technical pathway towards **production at MWh/(sub-)GWh scale**.
- Ensure **stability of Li** during handling, processing and operation using coatings or other protective technologies (e.g. barriers/protective layers).
- Processing of Li (Metal) and Li electrodes within cell assembly at **industrial scale**, high-quality **cutting of the Li foil and/or electrode**.
- Homogeneous Li films with **thickness below 20µm**, contributing towards energy density levels of **400-500 Wh/kg**.
- Process compatible with **recycling targets** and assure **recyclability** to more than 70% of Li metal in battery waste, (90% Li metal for production scrap).
- Contribute to a competitive price of **75€/kWh** at pack level.
- **Demonstration at cell level** (at least TRL5 with at least 1 Ah capacity). Validation in Generation 4b, 4c and/or Generation 5 cells is highly encouraged.

HORIZON-CL5-2024-D2-02-01
Sustainable high-throughput production processes for stable lithium metal anodes for next generation batteries

TYPE OF ACTION

- **IA –** Innovation Action
- Expected **TRL 6-7** by the end of the project

EU CONTRIBUTION

- Per project: **8 M€**
- Total: **8 M€**

Funding rate: 60%!

TIMING

- Call opening: **7 May 2024**
- Call closing: **05 Sept 2024**

- *Collaboration with **CL5-2023-02-01** Advanced materials and cells development enabling large-scale production of Gen4 solid-state batteries for mobility applications and/or **CL5-2024-02-02** Post-Li-ion technologies and relevant manufacturing techniques for mobility applications (Generation 5) is **expected**.*
- *Cooperation with **CL5-2023-01-01** Technologies for sustainable, low carbon and cost-efficient downstream processing and production of battery-grade materials **encouraged***

HORIZON-CL5-2024-D2-02-02
Post-Li-ion technologies and relevant manufacturing techniques for mobility applications (Generation 5)

SCOPE (1/2): at least 3 from improvement of materials

- **Surface coating materials** for metallic anode protection and/or activation, increase safety and cycle life.
- **Binders** with high chemical and thermal stability, reduce toxicity, water-based manufacturing
- Design and development of new cell technologies with **higher capacities** compared to Li-ion cells.
- Improve and increase the **electrodes-electrolyte compatibility** with additives to increase over cell time.
- Improve the **understanding of the chemical and/or electrochemical reaction mechanisms** using advanced techniques in the cells developed for Gen5 technologies.
- Improve the **insertion cathode** with high charge-storage capacity.
- Use of **safe and non-toxic** materials.
- New **efficient and sustainable catalysts** that can promote polysulfide conversion in Metal-S batteries or the oxygen evolution/reduction reactions in rechargeable Metal-air batteries.

HORIZON-CL5-2024-D2-02-02
Post-Li-ion technologies and relevant manufacturing techniques for mobility applications (Generation 5)

SCOPE (2/2)

All of design & manufacturing:

- Innovative cell design ensuring **high performances, low cost and ready for recycling**.
- Develop relevant manufacturing **processes**, assess the possible manufacturing **compatibility** with the existing lithium-ion production infrastructure and production lines.
- **Proof of concept** possibly at small pilot line scale.
- **Design production** with low environmental impact, safe and healthy environment for workers, low energy consumption.

HORIZON-CL5-2024-D2-02-02
Post-Li-ion technologies and relevant manufacturing techniques for mobility applications (Generation 5)

EXPECTED OUTCOMES: at least 1 of:

- Conversion systems based on **metallic anodes with enhanced safety**, delivering on cost, performance, sustainability and recyclability, with clear prospects for the feasibility of the **scale-up** of the manufacturing processes.
- **Metallic anode protection and/or activation** for conversion systems (polymer, ceramic and hybrid electrolytes) with increased safety, cycle life and low cost.
- Post lithium-ion cells based on **cations other than lithium with long cycle-life** (Sodium-ion is excluded and covered by topic HORIZON-CL5-2024-D2-01-02).
- Credible technical pathway to achieve all below by 2030:
  - Safe behaviour at cell level: expected EUCAR Hazard level below 4 for automotive; level 2 for aviation and waterborne applications;
  - Specific energy at cell level targeting 500 Wh/kg, and volumetric energy density at cell level targeting 600 Wh/l;
  - Charge and discharge with a C-rate between 2 and 10;
  - 800+ cycles at 50%DoD or 400 cycles at >80%DoD;
  - Cost at cell level < 75 euro/kWh.

HORIZON-CL5-2024-D2-02-02
Post-Li-ion technologies and relevant manufacturing techniques for mobility applications (Generation 5)

TYPE OF ACTION

- **RIA –** Research & Innovation Action
- Expected **TRL 4** by the end of the project

EU CONTRIBUTION

- Per project: **5 M€**
- Total: **15 M€**

TIMING

- Call opening: **7 May 2024**
- Call closing: **05 Sept 2024**

➢ *Link to CL5-2022-D2-01-08 – Battery 2030+ CSA*

HORIZON-CL5-2024-D2-02-03

Size & weight reduction of cell and packaging of batteries system, integrating lightweight and functional materials, innovative thermal management and safe and sustainable by design approach

SCOPE

Achieve size and weight reduction by

- Integration of advanced **cell technologies/generations**, **sensing** technologies,
- Use of **lightweight and multi-functional materials** that are safe and sustainable by design and lightweight structures for battery casing.
- Improvement of the **cell to system ratio** by adopting innovative packaging approaches to enable smart battery cell concepts. Approaches to **reduce the complexity of HV and BMS** architecture and substitution by alternatives.

- Improvements in cell and pack
- Address innovations in **manufacturing process**
- Improve battery performance and safety through innov. **Thermal management**
- Enhance safety by **developing and demonstrating safe by design** measures
- Demonstrate safety by **simulation at pack level**
- Focus on **system level**; higher integration can be part of scope
- Design for **manufacturing, EOL and LCA**

HORIZON-CL5-2024-D2-02-03

Size & weight reduction of cell and packaging of batteries system, integrating lightweight and functional materials, innovative thermal management and safe and sustainable by design approach

EXPECTED OUTCOMES

- An increase of the **net useful mass and volumetric energy density** of the battery system **between 10% and 30%** compared to the state-of-the-art battery systems.
- The improvement of the **safety by design** measures throughout the battery lifetime and during operation.
- Deliver thermal management to
  - **Increase performance** over the complete operational conditions
  - Enable **fast charging requirements** 10%-80% in 10 minutes maximum.
- Encouraged to contribute to standardisation of measures for safe thermal management
- Demonstrate and validate at **application level**, compliant with all relevant performance and safety standards

HORIZON-CL5-2024-D2-02-03

Size & weight reduction of cell and packaging of batteries system, integrating lightweight and functional materials, innovative thermal management and safe and sustainable by design approach

TYPE OF ACTION

- **IA –** Innovation Action
- Expected **TRL 6-7** by the end of the project

EU CONTRIBUTION

- Per project: **8 M€**
- Total: **16 M€**

TIMING

- Call opening: **7 May 2024**
- Call closing: **05 Sept 2024**

➢ *International Collaboration encouraged, esp. with USA*

Destination 5:

Clean and competitive solutions for all transport modes

European Commission

Thematic area

Zero-emission road transport (2ZERO)

Guido SACCHETTO - Maurizio MAGGIORE
DG RTD

European Commission

HORIZON-CL5-2024-D5-01-01
Smart, low-cost pervasive stationary slow charging and bi-directional solutions synergic with the grid for EV mass deployment

SCOPE

- Exhaustive coverage of **high-efficiency, low-power, low-cost on-street smart charging points**, with optimisation of civil works and grid requirements.
- Address **users' needs and requirements** in different socio-cultural contexts.
- Demonstration of **smart and bi-directional operation** in overnight publicly accessible environments for long-term (and for opportunistic) charging.
- Development of **innovative optimisation functions** exploiting real-time access to battery information.
- Solutions are expected to be provided on **non-discriminatory terms** between users and classes of users and avoid consumers lock-in.
- Optimise the use of **energy resources and infrastructures**.

HORIZON-CL5-2024-D5-01-01
Smart, low-cost pervasive stationary slow charging and bi-directional solutions synergic with the grid for EV mass deployment

EXPECTED OUTCOME

- **Removing barriers to EV user acceptability** in densely populated areas from technological, investment costs and costs of charging point of view.
- **Innovative conductive solutions** optimising efficiency and reducing costs, but ideally reducing visual and physical intrusion.
- Analytical **methodology** including **EU-wide scale models** to ensure efficient planning for mass deployment, with improvement of business models/gaps.
- **Socio-cultural databases** at city, regional and national level.
- Analysis of potential **regulatory aspects and barriers** for standardization.
- Multilevel **systemic architecture/solutions** for smart and bi-directional charging power management

HORIZON-CL5-2024-D5-01-01
Smart, low-cost pervasive stationary slow charging and bi-directional solutions synergic with the grid for EV mass deployment

TYPE OF ACTION

- **IA –**Innovation Action
- Expected **TRL 7-8** by the end of the project

EU CONTRIBUTION

- Per project**: 7-8 M€**
- Total: **15 M€**

Funding rate: 60%!

TIMING

- Call opening: **07 December 2023**
- Call closing: **18 April 2024**

Contribute to the BRIDGE initiative when relevant

➢ *Report on the results to 2ZERO partnership for KPIs monitoring*

HORIZON-CL5-2024-D5-01-02
Integration and testing of next generation post-800V electric powertrains

SCOPE

- **Holistic assessment of impacts** of higher voltage levels at vehicle and powertrain level, defining the best option for the **post-800V EV generation**.
- Development and integration of **power-electronic components with new concepts** for component miniaturisation and modularity. Topologies adapted to advanced wide-bandgap semiconductors and new materials.
- **Modular powertrain platforms** coming closer to a full mechanical, electrical or thermal integration of the main systems.
- Defining suitable **testing and validation procedures** and demonstrating on a suitable use case, analysing regulatory aspects and barriers to EU standards.
- Small-sized**, 'ready for integration' power modules** for design flexibility while optimizing costs.

HORIZON-CL5-2024-D5-01-02
Integration and testing of next generation post-800V electric powertrains

EXPECTED OUTCOME

- **Very fast charging, ultra-efficient EVs** for broad mass markets.
- Demonstrate **cost reduction of minimum 20%** of power electronic modules and inverters for a given power, and for the whole powertrain.
- **Fast charging** (C segment EV) **20% to 80% in 10 min** with 350kW chargers; practical range increases over travel time (~20% with same battery weight) with overall higher efficiency and easier thermal management.
- Significant advancements in **efficiency** (reduction of losses by 25%).
- Backwards **compatibility** and **reliability**; improved safety and robustness.
- **Improved resource efficiency**, better lifecycle impact and recycling capability.

HORIZON-CL5-2024-D5-01-02
Integration and testing of next generation post-800V electric powertrains

TYPE OF ACTION

- **RIA –** Research and Innovation Action
- Expected **TRL 5** by the end of the project

EU CONTRIBUTION

- Per project**: 4-6 M€**
- Total: **15 M€**

TIMING

- Call opening: **07 December 2023**
- Call closing: **18 April 2024**

- *Support the constant drive to improve efficiency and performance while increasing affordability.*
- *Exploitation of outcomes/knowledge from ECSEL/KDT partnership projects foreseen where applicable*
- *Report on the results to 2ZERO partnership for KPIs monitoring*

HORIZON-CL5-2024-D5-01-03
Advanced battery system integration for next generation vehicles

SCOPE

- Structural **battery pack design and integration** optimising trade-offs in all areas.
- **Smart thermal management systems** contributing to system efficiency and optimizing the overall battery system, also in consideration of passenger comfort.
- **Novel cooling system** concepts exploiting **gen-4 cells lower thermal demands** reducing impact on system mass and costs.
- Take into account the technical **communication channel** for **access and exchange of relevant data** from the BMS, **enhancing communication between battery and vehicle control units** for a more efficient battery operation by synchronizing ECUs of the BMS and the EV .
- **Digital twin** of thermal behavior of EV and battery for optimal chemistry / energy management and safety assessment of batteries.

HORIZON-CL5-2024-D5-01-03
Advanced battery system integration for next generation vehicles

EXPECTED OUTCOME

- **Novel and innovative approaches** to battery integration **exclusively focusing on gen-4 cells**, considering modular systems, capable for instance of temporary expansion.
- Improvement of **fast-charging capabilities** (at least 3C), and aiming for higher capabilities for high energy cells, independent of battery topology in the vehicle.
- **Increase gravimetric energy density** of the integrated pack (excluding contributions by cell chemistry) by at least 25%, and **volumetric energy density** by 70%.
- **Reduced battery system cost** (excluding contributions by cell chemistry, below EUR 100/kWh for light duty EVs by 2030); **specific safety aspects** of prototype cells to be considered, aiming however at optimizing for serial production cells.

HORIZON-CL5-2024-D5-01-03
Advanced battery system integration for next generation vehicles

TYPE OF ACTION

- **RIA –** Research and Innovation Action
- Expected **TRL 5** by the end of the project

EU CONTRIBUTION

- Per project**: 5 M€**
- Total: **10 M€**

TIMING

- Call opening: **07 December 2023**
- Call closing: **18 April 2024**

- *Links with projects funded under topic HORIZON-CL5-2023-D5-01-02: Innovative BMS*
- *Take into account access to battery information (RED proposal, COM(2021)557 of 14 July 2021)*
- *Report on the results to 2ZERO partnership for KPIs monitoring*

HORIZON-CL5-2024-D5-01-04
Integrated flexible multipoint megawatt charging systems for electric truck mass deployment

SCOPE

- Consider **typical demands** along TEN-T corridors (also under severe weather and peak traffic conditions) and **opportunities for sharing/balancing power supply** within studied **areas** (e.g., logistics terminals, truck stops, car-parkings)
- **Input** from EU **MS/AC maps** (aggregated charging demands and expected high power charging station localisations) and from **grid operators** on power system is expected. Terminals/ hubs should offer **charging on non-discriminatory basis**.
- Focus on real needs of **end users**, including optimised infrastructure locations, its reverse impact on the traffic flow, interoperable protocols; also with **identification and analysis of regulatory aspects / barriers** for relevant standardisation.
- Tools to **map the optimal locations** for fast/high-power charging infrastructure offering **planning,** taking into account on-board EV system characteristics.

HORIZON-CL5-2024-D5-01-04
Integrated flexible multipoint megawatt charging systems for electric truck mass deployment

EXPECTED OUTCOME

- Improved **multipoint megawatt charging systems** for future mass HDV deployment.
- **Tools** to identify **energy needs** and the **charging profiles** of HD EV.
- Integrated and flexible **interaction control** and **energy management** based on interoperable and open protocols.
- Improved **modelling of optimal geographical locations** for large-scale megawatt charging hubs (for HDV, MDV and LDV) considering the grid challenges.
- **Tools/services** for planning, operation, availability and reliability of charging multipoint hubs from users' perspectives, grid operators and energy providers.
- **Highly energy efficient megawatt-charging hubs**: demonstrate at least 4 flexible charging points (>1MW) each capable of recharging 4+ lighter vehicles (150-350 kW).

HORIZON-CL5-2024-D5-01-04
Integrated flexible multipoint megawatt charging systems for electric truck mass deployment

TYPE OF ACTION

- **IA –** Innovation Action
- Expected **TRL 8** by the end of the project

EU CONTRIBUTION

- Per project**: 7-8,5 M€**
- Total: **17 M€**

TIMING

- Call opening: **07 December 2023**
- Call closing: **18 April 2024**

- *On-board and off-board sub-systems design has been, as a first step, covered in topic HORIZON-CL5-2022-D5-01-08*
- *Topic open to international collaboration, in particular regarding interface specifications*
- *Report on the results to 2ZERO partnership for KPIs monitoring*

HORIZON-CL5-2024-D5-01-05
Advanced digital development tools to accelerate the development of software defined vehicles that enable zero-emission mobility

SCOPE

- **Design and validation of robust digital tools** to efficiently and effectively develop complex EVs, increasingly software-defined.
- Advanced **methods** for development of trustworthy (24/7 available, secure, safe) **software-defined EV solutions**.
- **Promoting use and adaption** of conceptional tools and **demonstrate integration** into development frameworks for virtual approval **applicable to all EV types** (from L-category to Heavy Duty vehicles).
- Concepts enabling the **feedback to and use of all types of data** (e.g., engineering data, real-life operational data of EVs) in the **product development** of software-defined vehicle functions including automated update.

HORIZON-CL5-2024-D5-01-05
Advanced digital development tools to accelerate the development of software defined vehicles that enable zero-emission mobility

EXPECTED OUTCOME

- **Design and validation** of **digital tools** for the automotive industry for digital development and operation enabling up to **20% energy consumption reduction** and ensuring performance, security, safety and reliability by design.
- Increased **speed of innovation** by optimising the **utilisation of data**.
- Solutions for **reliable 'virtual' decision-making** based on **digital twins**.
- **Method and tools** for reliable **modelling and simulation** of **total vehicle systems**.
- **Enhanced capabilities** in "software-defined" EV.
- Improved product quality, decision making, and exploiting data contributing to the **reduction of the overall development time**.

HORIZON-CL5-2024-D5-01-05
Advanced digital development tools to accelerate the development of software defined vehicles that enable zero-emission mobility

TYPE OF ACTION

- **RIA –** Research and Innovation Action
- Expected **TRL 4-5** by the end of the project

EU CONTRIBUTION

- Per project**: 4-5 M€**
- Total: **10 M€**

TIMING

- Call opening: **07 December 2023**
- Call closing: **18 April 2024**

- *Topic expected to go far beyond current development addressed in H2020 topics (e.g. H2020-GV-2018).*
- *Close collaboration is expected between selected projects.*
- *Report on the results to 2ZERO partnership for KPIs monitoring*

CLUSTER 5 Climate, Energy, Mobility

Destination 6

Safe, Resilient Transport and Smart Mobility services for passengers and goods

European Commission

Thematic area

Multimodal transport, infrastructure and logistics

Rafal STANECKI
DG MOVE

European Commission

HORIZON-CL5-2024-D6-01-06
Optimising multimodal network and traffic management, harnessing data from infrastructures, mobility of passengers and freight transport

SCOPE

Actions should address **at least 6** of the following 8 aspects:

- Developing and testing new **systems** using state of the art technologies (e.g., AI, big data, edge computing, internet of things, blockchain)
- **Effects** on new forms of mobility and innovative services
- **Simulations** of network-wide optimisation of traffic models
- **Demonstrations** of aggregation, analysis and use of **network-wide data**
- Early **pilots** of multimodal NTM in **mobility hubs** (e.g., rail nodes, ports)
- Designing and testing multimodal NTM **services**
- Showcasing workable **governance** and dynamic **incentive** models
- Evaluating the **impact** of the proposed measures and project results

HORIZON-CL5-2024-D6-01-06
Optimising multimodal network and traffic management, harnessing data from infrastructures, mobility of passengers and freight transport

EXPECTED OUTCOME

Project results are expected to contribute to **at least 4** of the following 5 expected outcomes:

- **Optimised multimodal transport network and traffic management**, for efficient door-to-door mobility of passengers and freight (from producers to last mile deliveries)
- **Validated solutions** for effective and secure **data exchange** across all modes of transport, for dynamic and responsive multimodal network and traffic management
- **Validated systems** for accurate **detection and resolution of network bottlenecks**, improving safety, security, resilience and overall performance of the transport network, enabling pro-active mobility management
- **New tools and services** for optimising mobility of passengers and freight, in cities and other areas, **cutting traffic jams** and improving multimodal traffic flows
- **Workable governance arrangements** for multimodal transport network and traffic management, in view of further supporting regulatory and policy actions

HORIZON-CL5-2024-D6-01-06
Optimising multimodal network and traffic management, harnessing data from infrastructures, mobility of passengers and freight transport

TYPE OF ACTION

- **RIA –** Research and Innovation Action
- Expected **TRL 5** by the end of the project

EU CONTRIBUTION

- Per project: **4-5 M€**
- Total: **10 M€**

TIMING

- Call opening: **7 May 2024**
- Call closing: **5 September 2024**

- *If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries are expected to describe if and how the use of **Copernicus and/or Galileo/EGNOS** are incorporated in the proposed solutions.*
- *Proposals should describe the technological and **societal readiness** of the systems and/or techniques proposed for development and use, particularly in the case of systems based on Artificial Intelligence.*
- ***International Cooperation** is encouraged*

HORIZON-CL5-2024-D6-01-07
Scaling up logistics innovations supporting freight transport decarbonisation in an affordable way

SCOPE

Focus on both digital and physical interoperability, and adoption of zero-emission vehicles/vessels

Develop and/or demonstrate:

- **At least 10** working open (and access) standard processes across several logistic **nodes**
- Further **compatibility and interoperability** of the full range of **standardised multimodal transport units**
- Models and processes for scalable multimodal logistics **networks connectivity**
- Tools and processes to achieve different types of **flows compatibility** and synchro-modal solutions
- **Benefit of decentralised inventory positions** in the pooled logistics network
- Sound **business and governance models** and rules for resource-sharing across logistics networks
- Functionalities and relevance of the **data sharing framework**, for optimisation of the logistic system
- **Scalability** of proposed solutions, specific actions to encourage access of **SMEs and smaller players**
- **Measure** the **benefits** of the scaled up horizontal collaboration among logistics networks

HORIZON-CL5-2024-D6-01-07
Scaling up logistics innovations supporting freight transport decarbonisation in an affordable way

EXPECTED OUTCOME

- Reduced greenhouse gas emissions **by 55% by 2030** in the project networks, without reducing the overall performance of the logistics supply chain and taking account of all costs and externalities
- **Gains in terms of operational efficiency and environmental impact** from the implementation of the Physical Internet are clearly identified, demonstrated and measured
- Logistics concepts **speeding up freight decarbonisation** and **adoption of zero emissions vehicles/vessels and multimodality** are developed

HORIZON-CL5-2024-D6-01-07
Scaling up logistics innovations supporting freight transport decarbonisation in an affordable way

TYPE OF ACTION

- **IA –** Innovation Action
- Expected **TRL 7** by the end of the project

EU CONTRIBUTION

- Per project: **10 M€**
- Total: **20 M€**

TIMING

- Call opening: **7 May 2024**
- Call closing: **5 September 2024**

- ➢ *If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of **Copernicus and/or Galileo/EGNOS** (other data and services may additionally be used).*
- ➢ *If the activities proposed involve the use and/or development of **AI**-based systems and/or techniques, the technical and social robustness of the proposed systems has to be described in the proposal.*

HORIZON-CL5-2024-D6-01-08

Improved transport infrastructure performance – Innovative digital tools and solutions to monitor and improve the management and operation of transport infrastructure

SCOPE

- **Improve performance** of transport infrastructure and **increase multimodality** and develop solutions for **self-monitoring**, **self-reporting**, **non-intrusive/non-destructive inspection and testing methods**
- Demonstrate ability to **process and deploy internal and external raw data**, building on the **common European mobility data space** and the **Digital Transport and Logistics Forum (DTLF)**
- Enhance **prediction of demand from individual behaviours**, enabling appropriate modal capacity and demand management
- Propose **digital solutions** contributing to a **more inclusive, comfortable, accessible and flexible infrastructures** and multi-modal services
- Include **at least three pilot demonstrations** of the proposed solutions in operational environment (minimum at TRL7) on **land and inland waterways transport infrastructure**

HORIZON-CL5-2024-D6-01-08
Improved transport infrastructure performance – Innovative digital tools and solutions to monitor and improve the management and operation of transport infrastructure

EXPECTED OUTCOME

- Optimised door-to-door mobility for passengers and goods by assuring at least **30% reduction of average delay**
- **Reduction of transport operation costs by 20%** for transport operators along with **20% reduction of fossil fuels consumption**
- Increase in the robustness of transport infrastructure by **reducing the infrastructure failure probability by 30%**
- **Reduce the transport emissions of GHG and other pollutants by 30% by 2030** in the pilot demonstrations
- **Reduce the number of accidents** involving infrastructure users and workers **by 50%**

HORIZON-CL5-2024-D6-01-08

Improved transport infrastructure performance – Innovative digital tools and solutions to monitor and improve the management and operation of transport infrastructure

TYPE OF ACTION

- **IA –** Innovation Action
- Expected **TRL 7** by the end of the project

EU CONTRIBUTION

- Per project: **5 M€**
- Total: **15 M€**

TIMING

- Call opening: **7 May 2024**
- Call closing: **5 September 2024**

- *If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of **Copernicus and/or Galileo/EGNOS** (other data and services may additionally be used).*
- *If the activities proposed involve the use and/or development of **AI**-based systems and/or techniques, the technical and social robustness of the proposed systems has to be described in the proposal.*

HORIZON-CL5-2024-D6-01-09
Policies and governance shaping the future transport and mobility systems

SCOPE

- Study how **policies and regulations** could be best used to **govern transport and mobility systems** / leverage on an ongoing change in habits that could result in **significant GHG reduction**:
  - Propose approaches that better **integrate mobility policies with policies from other sectors**
  - Explore how small, medium cities and metropolitan areas manage the emergence of **micro-mobility**
  - Identify the **major flows on national transport and mobility regulations** in EU countries and provide recommendations on how to better **harmonise them transnationally**
  - Examine the most effective strategies in promoting the transition to **more sustainable freight transport** (e-commerce etc.)
  - **Involve citizens from different backgrounds and origins** (study their understanding, perceptions, opinions and positions, for better policies' recommendations)

HORIZON-CL5-2024-D6-01-09
Policies and governance shaping the future transport and mobility systems

EXPECTED OUTCOME

- **Better understand the effects of governance and policies** on the choice of social groups to use a specific transport and/or mobility mode
- **Reinforce public engagement** in shaping co-created transport and mobility policies
- **Strengthen research-policy cooperation models** to reinforce impact and trust in science
- **Ensure effective and sustainable transport and mobility policies** at all levels toward accepted approaches, based on a **system-thinking** perspective
- Better harness the potential of digitised mobility data while **protecting citizen's privacy**
- Provide **policy recommendations sustainably integrating passenger and freight transport** in order to create a future proof holistic mobility system

HORIZON-CL5-2024-D6-01-09
Policies and governance shaping the future transport and mobility systems

TYPE OF ACTION

- **RIA –** Research and Innovation Action

EU CONTRIBUTION

- Per project: **3 M€**
- Total: **3 M€**

TIMING

- Call opening: **7 May 2024**
- Call closing: **5 September 2024**

Thematic area

Safety and resilience

Georgios TZAMALIS
DG MOVE

European Commission

HORIZON-CL5-2024-D6-01-10
Ensuring the safety, resilience and security of waterborne digital systems

SCOPE

- Development of a **HAZOP (Hazard operability) methodology** for whole system assessment of highly digitised, connected complex vessels
- Assessment of the **acceptability** of the HAZOP methodology and the development of an **implementation roadmap**
- **Integration** of on-board system and functions by design to **test and demonstrate the safety and security of applications**
- **Application** of the developed methodology on a complex, highly digitised vessel and **identification of safety critical systems and functions**; establishment of **reliability regimes and mitigation measures** concerning malicious intervention and system failure
- Development and demonstration of **cost-effective methodologies for validating** the safety, resilience and correct functioning of digital and connected safety critical ship systems, including system of systems

HORIZON-CL5-2024-D6-01-10
Ensuring the safety, resilience and security of waterborne digital systems

EXPECTED OUTCOME

- **Increased safety and resilience** of waterborne digital systems, including system of systems and their functions
- **Improved system design** addressing **human factors** issues in the changing levels of human/automated system interactions
- **Assurance** of the resilience, safety and security of waterborne digital and connected systems
- **Robust by design** waterborne digital and connected systems for safety and resilience
- **Methodologies** to enable effective HAZOP analysis and validation of waterborne digital systems
- Increased **software safety and cyber security**

HORIZON-CL5-2024-D6-01-10
Ensuring the safety, resilience and security of waterborne digital systems

TYPE OF ACTION

- **RIA** – Research and Innovation Action
- Expected **TRL 5-6** by the end of the project

EU CONTRIBUTION

- Per project: **4 M€**
- Total: **8.5 M€**

TIMING

- Call opening: **7 May 2024**
- Call closing: **5 September 2024**

➢ *If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of **Copernicus and/or Galileo/EGNOS** (other data and services may additionally be used).*

HORIZON-CL5-2024-D6-01-11
Effects of disruptive changes in transport: towards resilient, safe and energy efficient mobility

SCOPE

To provide safe and resilient transport for all, proposed actions are expected to address **at least 3** of the following aspects:

- **Scenarios of disruptive changes** that can make a transport system unstable should be identified, the **consequences on transport safety** be analysed, and **solutions** to tackle them developed. This includes safety implications of rapid changes / new incentives
- Analysis of how **socio-economic differences** may affect the safety of individuals in case of disruptive changes
- **Study** of how the **concept of resilience at the system level** can be applied and used for the improvement of transport safety
- Development of **recommendations** on how to improve transport safety and resilience through **suburban planning and future housing developments** with their effects on the demand for transport and through the design of transport infrastructure networks

HORIZON-CL5-2024-D6-01-11
Effects of disruptive changes in transport: towards resilient, safe and energy efficient mobility

EXPECTED OUTCOME

- **Transport systems that are resilient**, i.e. prepared for disruptive changes of different kinds, and thereby supporting continuously improved traffic safety
- **Resilience to unexpected events** (pandemics, natural disasters, political decisions, conflicts, energy and fuel disruptions, raw materials and component supply vulnerabilities etc.) as an **integrated principle** in the design and development of future transport systems
- **Increased understanding** how **sudden changes** in the availability of transport means e.g. through dramatic weather events or emission induced ban of certain vehicles in a city, affect the **safety of transport system users**, and the **underlying psychological effects** for users' reactions

HORIZON-CL5-2024-D6-01-11
Effects of disruptive changes in transport: towards resilient, safe and energy efficient mobility

TYPE OF ACTION

- **RIA** – Research and Innovation Action

EU CONTRIBUTION

- Per project: between **3** and **3,5 M€**
- Total: **7 M€**

TIMING

- Call opening: **7 May 2024**
- Call closing: **5 September 2024**

- ***International cooperation*** *is encouraged.*
- *If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of* ***Copernicus and/or Galileo/EGNOS*** *(other data and services may additionally be used).*

HORIZON-CL5-2024-D6-01-12
A new framework to improve traffic safety culture in the EU

SCOPE

Actions should contribute to establishing a framework for cultural transformation in road safety across the EU:

- Better understanding of the **link between road safety outcomes and safety culture**
- Consideration of **traffic behaviour with high safety impacts** (speed, distraction, alcohol or drugs…)
- Assessment of **safety cultures from other transport modes** and interplay between shifting to more energy efficient mobility solutions and traffic safety
- Safety impacts of **new technologies** incl. ADAS and new transport means and services (micro-mobility)
- Stocktaking of **good practices** from countries and companies **worldwide**
- Guidance on design and evaluation of **interventions to define traffic safety culture in all areas affecting road safety**: for decision-makers, practitioners, individual road users, enterprises and authorities
- At least **3 different pilot tests of interventions** in different EU MS/Associated countries

HORIZON-CL5-2024-D6-01-12
A new framework to improve traffic safety culture in the EU

EXPECTED OUTCOME

- Support the EU Vision Zero goal, the Safe System Approach and UN SDGs
- **Remedial action** against **impacts of the COVID-19 pandemic** on certain road safety risk factors e.g. shift from collective to individual means of transport. Shift to increase efficiency in road safety related public spending across Europe
- **Development and evaluation of strategies** to transform the traffic safety culture of road users and stakeholders incl. social norms, attitudes, perceived control, values, and system assumptions
- **Concepts and guidelines** to make the concept of traffic safety culture an integral part of road safety work of actors across the socio-economic systems of European societies
- **Better understanding** of the **link between road safety outcomes and safety culture**; **pilot implementation of road safety education** at secondary school level, for decision makers and practitioners

HORIZON-CL5-2024-D6-01-12
A new framework to improve traffic safety culture in the EU

TYPE OF ACTION

- **RIA** – Research and Innovation Action

EU CONTRIBUTION

- Per project: **3,5 M€**
- Total: **7 M€**

TIMING

- Call opening: **7 May 2024**
- Call closing: **5 September 2024**

- *Special attention should be given to **EU countries with lower safety performance**.*
- ***International cooperation** with USA and/or Australia is encouraged.*
- *If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of **Copernicus and/or Galileo/EGNOS** (other data and services may additionally be used).*

Thematic area

Cooperative, Connected and Automated Mobility (CCAM)

Suzanna KRAAK – Andrea DE CANDIDO

DG RTD

Anna-Marya MARTYSHCHUK

DG MOVE

European Commission

HORIZON-CL5-2024-D6-01-01

Centralised, reliable, cyber-secure & upgradable in vehicle electronic control architectures for CCAM connected to the cloud-edge continuum (CCAM Partnership)

SCOPE 1/2

- A complete **redesign** of the in-vehicle control architecture, combining innovations at **hardware**, **software** and **data** levels in the vehicle, as well as **sensors** and **sensor** data fusion for environment perception with AI “at the edge”, using on-board **high - performance computers** and generic hard- and software including **cyber secure** components.

- Build upon a **centralised** e.g., zonal or domain-based layout using distributed high-performance computing for connecting sensing and actuation systems with software updates over the air, big data flows and AI at the edge, resulting in a **novel** and **upgradable** electronic in-vehicle control scheme for safe and efficient automated driving functions and tele-operations.

HORIZON-CL5-2024-D6-01-01

Centralised, reliable, cyber-secure & upgradable in vehicle electronic control architectures for CCAM connected to the cloud-edge continuum (CCAM Partnership)

SCOPE 2/2

- New control architectures should enable:
  - **reliable**, **low-latency** and **high-bandwidth data communication** for automated driving systems control to safeguard against cyber-attacks, malfunctions and malicious interactions.
  - **systemic functionality gains** in upgradability, efficiency, modularity, compatibility, scalability, fail-operation, reliability and redundancy.
  - definition of **safety** and **security targets**, open-source standard layouts and harmonised validation methods.

HORIZON-CL5-2024-D6-01-01

Centralised, reliable, cyber-secure & upgradable in vehicle electronic control architectures for CCAM connected to the cloud-edge continuum (CCAM Partnership)

EXPECTED OUTCOMES

- New, centralised, reliable, cyber-secure and upgradable **in-vehicle electronic control architectures** for CCAM based on the application of **co-designed hardware**, **software** and **big** or **smart data flows** in combination with **over-the-air updates**.

- **Widespread deployment** of **level 4 automation** in road vehicles by **expanding** the **ODDs** of the control system towards higher complexity (city traffic, adverse weather conditions etc.) or greater scale.

- **Safe operation** of **Connected and Automated Driving functions** e.g., regarding Vulnerable Road Users (VRUs) and ODD transitions through system agility, experience-based decision making and access to cloud intelligence.

- Paradigm **shift from human-based** and **component-supported vehicle control** to a more **integrated**, resource efficient and **reliable system** for the control of CCAM systems.

- **Strengthened cooperation** of **European OEMs** and **suppliers** to co-design a standard cyber secure electronic architecture layout with harmonised interfaces.

HORIZON-CL5-2024-D6-01-01

Centralised, reliable, cyber-secure & upgradable in vehicle electronic control architectures for CCAM connected to the cloud-edge continuum (CCAM Partnership)

TYPE OF ACTION

- **RIA –**Research & Innovation Action
- Expected **TRL 5** by the end of the project

EU CONTRIBUTION

- Per project: **6 M€**
- Total: **12 M€**

TIMING

- Call opening: **7 May 2024**
- Call closing: **5 September 2024**

- *If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).*
- *Projects will be expected to report on results to the EU CCAM Partnership in support of the monitoring of its KPIs.*
- *International cooperation with the USA and Japan is encouraged.*

HORIZON-CL5-2024-D6-01-02

Scenario-based safety assurance of CCAM and related HMI in a dynamically evolving transport system (CCAM Partnership)

SCOPE 1/2

- Developing a **validation methodology** for **scenario-based** safety assurance of **AI-based** CCAM **functions** to enhance trustworthiness and robustness of the ODDs.
- Developing **validation procedures** for CCAM systems that rely on **V2X** for safety-critical functions, ensuring reliability, trustworthiness, and cyber-security, and keeping V2X connectivity technology neutral.
- Developing a **continuous safety validation methodology approach**, to monitor the safety state of deployed CCAM systems in real traffic during its service life, following type approval. **Performance metrics** for the reliability of the monitored data, including cyber-security aspects, and indicators for the safety state should be proposed.
- Developing **requirements** for the **monitoring system** for use in **future standardisation**, regarding the exchange of data and safety performance indicators with service organisations and authorities.

HORIZON-CL5-2024-D6-01-02

Scenario-based safety assurance of CCAM and related HMI in a dynamically evolving transport system (CCAM Partnership)

SCOPE 2/2

- Developing **tools** that provide a **high** degree of **detail** and **representation** of other **road users**' **behaviour** (incl. VRUs, pedestrians, bicyclists) in **virtual scenario-based testing**, incl. methods that deal with perception, localisation, and world modelling errors in the validation procedures.

- Developing a **safety assurance methodology** that incorporates the assessment of **Human Machine Interaction (HMI)** (both driver-vehicle and vehicle-road user) concepts for higher levels of automation (conformity checks as well as test set-ups with suitable metrics) ensuring **safe communication** between driver and vehicle and between vehicle and other road users, making HMI **inclusive** (i.e. in terms of age, mental and physical ability, cultural aspects, etc.).

HORIZON-CL5-2024-D6-01-02

Scenario-based safety assurance of CCAM and related HMI in a dynamically evolving transport system (CCAM Partnership)

EXPECTED OUTCOME

- **Safe scaling-up** of the **deployment of CCAM systems** for **all levels of automation**, including systems that rely on human-machine interaction for parts of the driving phases.
- **Assurance of vehicle safety** despite system changes, e.g., due to software updates and data exchanges between vehicles and the infrastructure.
- **Facilitating** the introduction of **fast developing technological innovations** in the CCAM system's functionality, such as AI.

HORIZON-CL5-2024-D6-01-02

Scenario-based safety assurance of CCAM and related HMI in a dynamically evolving transport system (CCAM Partnership)

TYPE OF ACTION

- **RIA –**Research and Innovation Action
- Expected **TRL 5** by the end of the project

EU CONTRIBUTION

- Per project: **14 M€**
- Total: **14 M€**

TIMING

- Call opening: **7 May 2024**
- Call closing: **5 September 2024**

- *If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).*
- *Projects will be expected to report on results to the EU CCAM Partnership in support of the monitoring of its KPIs.*
- *Actions should be based on methodologies developed in the HEADSTART project, as well as research funded under HORIZON-CL5-2021-D6-01-02.*
- *Links should be established with the Mobility Data Space initiatives from Digital Europe, federated data infrastructure projects (Gaia-X, International Data Spaces, Big Data Value -BDV).*
- *International cooperation with the USA and Japan is encouraged.*

HORIZON-CL5-2024-D6-01-03

Orchestration of heterogeneous actors in mixed traffic within the CCAM ecosystem (CCAM Partnership)

SCOPE (1/2)

To advance on the orchestration of heterogeneous actors in mixed traffic by building on, linking and integrating the following streams of research results and innovation challenges:

- **smart routing** and **interactive traffic management** using connectivity and C-ITS;
- solutions for ensuring the **safety** and **efficiency** of **early CCAM deployment** in the **interaction** of drivers, riders, passengers, traffic participants and automated systems performing driving tasks in **mixed traffic**;
- coherent approach towards **managing fleets** from an **overall system perspective** in real life urban demonstrations of CCAM via **testing** and **demonstrations** in large sets of traffic environments with an emphasis on different fleets that are typically **controlled/supervised/managed** by **heterogeneous** actors;
- new **governance** and **operational models**.

HORIZON-CL5-2024-D6-01-03

Orchestration of heterogeneous actors in mixed traffic within the CCAM ecosystem (CCAM Partnership)

SCOPE (2/2)

- Defining the comprehensive **requirements** (including data exchange) for the **orchestration schemes** with regards to the heterogeneous actors in mixed traffic (automated and non-automated traffic, people and goods and different modes).
- Developing **traffic management tools** that are essential for the coordination of mixed automated and non-automated mobility.
- Defining and demonstrating **business** and **governance models** (including for public actors).
- Developing measures and **KPIs** to demonstrate the **benefits** and added value of **orchestration** for **traffic management** actions (in terms of traffic efficiency, energy efficiency, safety etc.).
- Demonstrating a process that ensures **trust** in the **traffic orchestration** scheme proposed as well as **sufficient accessibility** to quality data for all traffic actors involved and readiness for large-scale demonstration actions.

HORIZON-CL5-2024-D6-01-03

Orchestration of heterogeneous actors in mixed traffic within the CCAM ecosystem (CCAM Partnership)

EXPECTED OUTCOME

- **System approach** towards traffic management that integrates the operations and needs of a wide range of road network users within the mobility ecosystem
- **Safer, more efficient and sustainable** traffic management
- Proven orchestration schemes in traffic management for operations of all types of vehicles and the different CCAM systems in **real-time CCAM traffic conditions in urban and/or motorway environments.**
- Governance and operational models that allow for **better cooperation and collaboration**
- Mobility management tools to **seamlessly integrate CCAM systems and services** including fleets of vehicles, public transport, logistics operations, demand management needs as well as governance and business models into the transport system
- **Strategic transport planning methods** for all modes in the CCAM ecosystem including individual as well as public transport

HORIZON-CL5-2024-D6-01-03

Orchestration of heterogeneous actors in mixed traffic within the CCAM ecosystem (CCAM Partnership)

TYPE OF ACTION

- **IA –**Innovation Action
- Expected **TRL 6-7** by the end of the project

EU CONTRIBUTION

- Per project: **6 M€**
- Total: **12 M€**

TIMING

- Call opening: **7 May 2024**
- Call closing: **5 September 2024**

- ➢ *Link to CL5-2024-D6-01-3 - Orchestration of heterogeneous actors in mixed traffic within the CCAM ecosystem (CCAM Partnership)*
- ➢ *International cooperation is encouraged, in particular with Japan and the United States but also with other relevant strategic partners in third countries*

HORIZON-CL5-2024-D6-01-04

AI for advanced and collective perception and decision making for CCAM applications (CCAM Partnership)

SCOPE 1/2

- Methods to **establish collective awareness** of CCAM applications that are resilient to faulty sources, thereby ensuring safe operations. Guidance for failsafe designs should be developed.

- Methods to **embed** an **HI approach** in the entire action chain towards collective awareness to allow for seamless operation and real-time decision-making while enabling **human-like control** of CCAM applications by combining system and domain knowledge (of the vehicle and its technologies on one hand and of the transport environment including all the human interactions on the other, thereby understanding of potential risks and capabilities and needs of other road users).

HORIZON-CL5-2024-D6-01-04

AI for advanced and collective perception and decision making for CCAM applications (CCAM Partnership)

SCOPE 2/2

- **Tooling** to deliver **situational awareness** information in a structured way, based on **multiple sources** and in **real-time**. In addition, the development and integration of **ethical goal functions** to support collective awareness should be included. Work is expected to be based on:
  - Perception systems, sensor fusion, high-level world models/maps, vehicle positioning information. Guidance on common reference systems for positioning and time for synchronisation should be included in order to secure robustness and traceability.
  - Relationships between the vehicle and forecasted intentions of other road users (e.g. a pedestrian crossing the street at a zebra crossing), as such including spatial temporal relation of elements in the driving-situation.

HORIZON-CL5-2024-D6-01-04

AI for advanced and collective perception and decision making for CCAM applications (CCAM Partnership)

EXPECTED OUTCOME 1/2

- Approaches for **resilient collective awareness**, which can eventually be used in e.g. complex models of collective behaviour.
- Advanced **collective awareness**, **decision making** and triggering of actions for CCAM applications, enabled by new concepts and tools built on advancements in **Artificial Intelligence** (AI), including **Hybrid Intelligence** (HI).
- CCAM solutions evolving from **reactive** into **predictive** system state awareness (including driver state and road user diversity), decision making and actuation, enhancing road safety.

HORIZON-CL5-2024-D6-01-04

AI for advanced and collective perception and decision making for CCAM applications (CCAM Partnership)

EXPECTED OUTCOME 2/2

- Understanding of **AI-related ethical issues** and user needs, together with capabilities, limitations and potential conflicts of AI based systems for CCAM, including a definition and a measure of human-like control.

- Increased **user acceptability** and societal benefit of CCAM solutions, based on **explainable**, **trustworthy**, and **human-centric AI**. Interactions with AI-based vehicles are understandable, human-like and reflect human psychological capabilities.

HORIZON-CL5-2024-D6-01-04

AI for advanced and collective perception and decision making for CCAM applications (CCAM Partnership)

TYPE OF ACTION

- **RIA –** Research and Innovation Action
- Expected **TRL 5** by the end of the project

EU CONTRIBUTION

- Per project: **5 M€**
- Total: **10 M€**

TIMING

- Call opening: **7 May 2024**
- Call closing: **5 September 2024**

- ➢ *If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).*
- ➢ *Projects will be expected to report on results to the EU CCAM Partnership in support of the monitoring of its KPIs.*

HORIZON-CL5-2024-D6-01-05

Robust Knowledge and Know-How transfer for Key Deployment Pathways and implementation of the EU-CEM (CCAM Partnership)

SCOPE 1/2

- Identify needs for **targeted content** for specific stakeholder categories and develop content that is **accessible** to non-experts, supporting **capacity building** of the public. The proposed action should define the above-mentioned stakeholder categories and develop a subsequent **communication strategy** using realistic and accessible terms to address different target groups.

- Provide effective **dissemination** and **concertation mechanisms** and means for the stakeholder community to enable the **exchange** of **experiences** and **practices**, stimulate collaboration and cooperation between CCAM stakeholders and reach **consensus** on future R&I needs within the CCAM Partnership.

- Facilitate the work of the **CCAM SRG** and **stimulate** the **cooperation** between EU Member States/Associated Countries. Provide an analysis of initiatives in EU Member States/Associated countries and support the SRG in identifying areas for R&I cooperation.

HORIZON-CL5-2024-D6-01-05

Robust Knowledge and Know-How transfer for Key Deployment Pathways and implementation of the EU-CEM (CCAM Partnership)

SCOPE 2/2

- Ensure **representation** of **EU stakeholders** in **international cooperation**, information exchange and harmonisation initiatives on CCAM. Provide a global output on CCAM activities to support the development of European agendas by exploring potential opportunities and R&I domains for international cooperation.

- Continue to **evaluate** and **update** the **EU-CEM** with EU Member States/Associated countries to ensure alignment with national strategies and regulations, looking at national and regional transport and mobility data to ensure compatibility.

- Support the practical **implementation** of the **EU-CEM** (for existing and innovative use cases) and provide **training programmes** for CCAM projects to integrate the methodology.

- Assess the level of **awareness**, **attitudes** and **intention** to use CCAM of European citizens, decision- and policy makers through regular **surveys** and **workshops**. Results should be published in the Knowledge Base and mechanisms should be provided to integrate findings into the EU-CEM. This action should be grounded in a co-creative process.

HORIZON-CL5-2024-D6-01-05

Robust Knowledge and Know-How transfer for Key Deployment Pathways and implementation of the EU-CEM (CCAM Partnership)

EXPECTED OUTCOME

- **Extended** and **updated CCAM Knowledge Base**, incl. CCAM projects, demonstration and deployment initiatives, standards, facilitating the exchange of best practices and the deployment of CCAM services, together with a well **established network** of **experts** and forum for stakeholders.

- Strong **collaboration** and **cooperation** between all **CCAM stakeholders** through effective collaboration mechanisms fostering exchanges of practices, experiences, tools and methodologies supporting the transition to large-scale deployment.

- **Increased** and **high-quality** exchanges and cooperation between the EU **Member States/Associated countries**.

- **EU CCAM common evaluation methodology** (EU-CEM) **widely used** in Europe.

- Good level of **understanding** and **awareness** of **CCAM** among citizens, decision and policy makers in Europe.

HORIZON-CL5-2024-D6-01-05

Robust Knowledge and Know-How transfer for Key Deployment Pathways and implementation of the EU-CEM (CCAM Partnership)

TYPE OF ACTION

- **CSA –** Coordination and Support Action

EU CONTRIBUTION

- Per project: **4,5 M€**
- Total: **4,5 M€**

TIMING

- Call opening: **7 May 2024**
- Call closing: **5 September 2024**

- *If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).*
- *Projects will be expected to report on results to the EU CCAM Partnership in support of the monitoring of its KPIs.*
- *International cooperation with the USA and Japan is encouraged.*