

**EN**

## **Annex VII**

### **Horizon Europe**

### **Work Programme 2025**

#### *8. Climate, Energy and Mobility*

##### **DISCLAIMER**

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## **Introduction**

The overarching driver for this cluster is to accelerate the twin green and digital transitions and associated transformation of our economy, industry and society with a view to achieving climate neutrality in Europe by 2050. This encompasses the transition to greenhouse gas neutrality of the energy and mobility sectors by 2050 at the latest (as well as that of other sectors not covered by this cluster), while boosting their competitiveness, resilience, and utility for citizens and society. Europe has been at the forefront of climate science and is committed to keep delivering the knowledge for enabling efficient pathways and just transitions to climate neutrality.

Activities of this work programme support the implementation of the Paris Agreement and the United Nations Sustainable Development Goals<sup>1</sup>. By putting research and innovation at the heart of our economy, the EU aims to create more jobs and improve the competitiveness of its industry. On this basis, activities of this work programme will support the European Commission's Clean Industrial Deal, a more circular and resilient economy, as well as enhanced climate adaptation, preparedness and solidarity. This will finally contribute to sustaining our quality of life and a strengthening of European societies and their social models.

Cluster 5 supports the EU's strategic objectives through activities included in this work programme and through the support of Institutional European Partnerships<sup>2</sup> which are implemented through dedicated structures. Although the latter activities are not included in this work programme, it is of great importance to maximise synergy and coherence between activities regardless of their implementation mode<sup>3</sup>. Cluster 5 contributes also to the Strategic Energy Technology Plan (SET Plan) objectives and its implementation working groups.

Activities in this work programme will contribute to all **Key Strategic Orientations (KSOs)** of the Strategic Plan:

- **The green transition:** Horizon Europe R&I activities must support Europe to become the world's first climate-neutral continent by 2050 and to tackle biodiversity loss and pollution. At least 35% of Horizon Europe's resources are committed to be spent on climate action and 10% for 2025-2027 on biodiversity action.

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<sup>1</sup> Activities in this cluster will contribute to multiple SDGs, with the most direct impact on SDG 7 (Affordable and clean energy), SDG 9 (Industry, Innovation and Infrastructure), SDG 11 (Sustainable Cities and Communities), and SDG 13 (Climate Action). In addition, SDG 3 (Good health and well-being), SDG 6 (Clean Water and Sanitation), SDG 8 (Decent work and economic growth), and SDG 12 (Responsible production and consumption) will be positively impacted.

<sup>2</sup> Clean Hydrogen, Transforming Europe's rail system, Integrated Air Traffic Management, Clean Aviation

<sup>3</sup> Activities specifically targeting fuel cells and hydrogen are primarily supported through calls for proposals of the European Partnership on Clean Hydrogen. However, in justified cases and in line with topic descriptions, specific aspects of hydrogen and fuel cells can be supported outside of the Clean Hydrogen Partnership

- **The digital transition:** Research to support the digital transition is key to Europe's competitiveness and open strategic autonomy, and to setting human-centred standards. It is also key to achieving the green transition. In 2021-2027, it is agreed to invest at least EUR 13 billion from Horizon Europe in core digital technologies.
- **A more resilient, competitive, inclusive and democratic Europe:** Europe's democratic values and principles need a strong foundation so they can be promoted globally. Horizon Europe research activities will help provide this foundation. This includes research on civil security, on a fair and environmentally friendly economic model, on health and wellbeing and on democratic participation.

**Open strategic autonomy** and securing Europe's leading role in developing and deploying critical technologies are overarching principles that apply across all three key strategic orientations.

To contribute to these programme-level KSOs, cluster 5 will deliver on six specific **expected impacts**. In this work programme, each expected impact has been transformed into a specific **Destination** (see table below). This Destination-based work programme structure follows a thematic centre-of-gravity approach. Activities can have a cross-cutting character and will, in practice, often contribute to multiple expected impacts. The specific contribution to the overall expected impacts is explained in the introductory text of each Destination.

<b>Expected Impact (Strategic Plan 2025-2027)</b>	<b>Destination (Cluster 5 work programme 2025)</b>
21. Advancing science for a transition to a climate-neutral and resilient society	1. Climate sciences and responses for the transformation towards climate neutrality
22. Facilitating a clean and sustainable transition of the energy and transport sectors towards climate neutrality through cross-cutting solutions	2. Cross-sectoral solutions for the climate transition
23. Ensuring more sustainable, secure and competitive energy supply through solutions for smart energy systems based on renewable energy solutions	3. Sustainable, secure and competitive energy supply
24. Using energy in buildings and industry in an efficient, affordable and sustainable way	4. Efficient, sustainable and inclusive energy use
25. Achieving sustainable and competitive transport modes	5. Clean and competitive solutions for all transport modes
26. Multimodal systems and services for climate-neutral, smart and safe mobility	6. Safe Resilient Transport and Smart Mobility services for passengers and goods

According to the **intervention logic** of this work programme, Destination 1 fosters climate science and thus helps to identify effective and efficient pathways and responses to climate change. Destination 2 supports different cross-cutting technologies and solutions for climate, energy and mobility applications. Destination 3 and 4 focusses mainly on energy issues – Destination 3 on making energy supply more sustainable, secure and competitive; Destination 4 on reducing energy demand of buildings and industry and enabling their more active role in a smart energy system. Destination 5 and 6 improve the performance of transport modes and mobility solutions – Destination 5 increases the competitiveness and climate/environmental performance of different transport modes; Destination 6 advances mobility services and solutions at system level for passengers and goods.

Cluster 5 supports the EU's strategic objectives through activities included in this work programme and through **Institutional European Partnerships**<sup>4</sup> which are implemented via dedicated structures. Although the latter activities are not included in this work programme, it is of great importance to maximise synergy and coherence between activities regardless of their implementation mode<sup>5</sup>.

Horizon Europe is the EU's research and innovation support programme in a system of European and national funding programmes that share similar policy objectives. Projects that have been awarded a grant under a Horizon Europe call could have the possibility to also receive funding under other EU programmes, including relevant shared management funds. In this context, applicants should actively seek **synergies** with other R&I-relevant EU, national or regional programmes (such as European Regional Development Fund (ERDF)<sup>6</sup>, European Social Fund Plus (ESF+)<sup>7</sup>, Just Transition Fund<sup>8</sup>, LIFE<sup>9</sup>, Innovation Fund<sup>10</sup>, InvestEU<sup>11</sup>, European Defence Fund (EDF)<sup>12</sup>), where appropriate, as well as private funds or financial instruments.

With a view to be more effective in achieving impact, proposals are expected to synergise with other relevant initiatives funded at EU level, including the **Knowledge and Innovation**

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<sup>4</sup> Clean Hydrogen, Transforming Europe's rail system, Integrated Air Traffic Management, Clean Aviation

<sup>5</sup> Activities specifically targeting fuel cells and hydrogen are primarily supported through calls for proposals of the European Partnership on Clean Hydrogen. However, in justified cases and in line with topic descriptions, specific aspects of hydrogen and fuel cells can be supported outside of the Clean Hydrogen Partnership

<sup>6</sup> [https://ec.europa.eu/regional\\_policy/en/funding/erdf/](https://ec.europa.eu/regional_policy/en/funding/erdf/)

<sup>7</sup> <https://ec.europa.eu/esf/main.jsp?catId=62&langId=en>

<sup>8</sup> [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/just-transition-mechanism/just-transition-funding-sources\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/just-transition-mechanism/just-transition-funding-sources_en)

<sup>9</sup> <https://ec.europa.eu/environment/archives/life/index.htm>

<sup>10</sup> <https://ec.europa.eu/inea/en/innovation-fund>

<sup>11</sup> [https://ec.europa.eu/commission/priorities/jobs-growth-and-investment/investment-plan-europe-juncker-plan/whats-next-investeu-programme-2021-2027\\_en](https://ec.europa.eu/commission/priorities/jobs-growth-and-investment/investment-plan-europe-juncker-plan/whats-next-investeu-programme-2021-2027_en)

<sup>12</sup> [https://defence-industry-space.ec.europa.eu/eu-defence-industry/european-defence-fund-edf\\_en](https://defence-industry-space.ec.europa.eu/eu-defence-industry/european-defence-fund-edf_en); While focusing on civilian applications, there may be synergies with actions conducted under the European Defence Fund or its precursor programmes (Preparatory Action on Defence Research and European Defence Industry Development Programme), e.g. in the field of energy storage and management as well as innovative fuels.

**Communities (KICs)** of the European Institute of Innovation and Technology (EIT)<sup>13</sup>. The innovation ecosystems created and nurtured by the EIT KICs (e.g., EIT Climate-KIC, EIT InnoEnergy, EIT Raw Materials) can in particular contribute to building communities or platforms for coordination and support actions, sharing knowledge or disseminating the exploitation of the project results. Where relevant, and without prejudice to the direct participation of the EIT KICs in the R&I activities under this cluster, proposals are encouraged to explore other forms and means of service provisions distinct from the EIT KICs that can be complementary to the considered proposals and their activities. Collaboration with other innovation communities that can well support the project implementation and impact is also encouraged. Any such cooperation should be based on adequate intellectual property management strategies.

Research has proven that **Social Sciences and Humanities (SSH)** and stakeholders' involvement including citizens and civil society in projects is pivotal to facilitate societal buy-in and long-lasting market integration of a system or technology, so they are addressed in relevant topics across the six destinations of the Cluster 5 work programme. In addition, this work programme pilots the integration of **Societal Readiness** (through seven pilot topics and a Coordinating and Support Action (CSA) for monitoring and evaluation: HORIZON-CL5-2025-03-D2-09), which approach is based on Responsible Research and Innovation processes, with a strong focus on interdisciplinarity and knowledge integration. The Societal Readiness approach aims, when integrated into R&I processes, to improve the consideration of different societal needs and concerns and to respond to them, thereby increasing the potential for societal uptake.

Horizon Europe's approach to **international cooperation** consist of multilateralism and purposeful openness, combined with targeted actions with key third-country partners. Actions focus on aligning national, European and global efforts and investments in research and innovation areas that contribute towards achieving key European Commission priorities. With regard to Cluster 5, the Commission pushes the acceleration of clean energy innovation through the Mission Innovation<sup>14</sup> Initiative, which was launched at COP21 and currently comprises 24 countries and the European Commission. International cooperation of EU Member States and Associated Countries in the context of Mission Innovation in relevant topics in this work programme is encouraged. In addition, this work programme specifically addresses cooperation with African countries and cooperation on sustainable decarbonisation with major emitting countries around the world, in line with the spirit of the Paris Agreement which emphasises the need for global cooperation on technology development and transfer. Legal entities established in **China** are not eligible to participate in Innovation Actions in any capacity. Please refer to the Annex B of the General Annexes of this Work Programme for further details.

Applicants to calls of this Work Programme are encouraged to consider, where relevant, the services offered by the EU-funded European Research Infrastructures, notably those

<sup>13</sup>

<https://eit.europa.eu/our-communities/eit-innovation-communities>

<sup>14</sup>

<http://mission-innovation.net/our-work/innovation-challenges/>

prioritised by the European Strategy Forum on Research Infrastructures (ESFRI)<sup>15</sup>, European Research Infrastructure Consortia (ERICs)<sup>16</sup> and the European Open Science Cloud.

For topics in this cluster, consortia could consider their voluntary contribution in terms of data, indicators, and knowledge to relevant **Joint Research Centre** (JRC) platforms for capitalising the knowledge developed in their projects and become more policy relevant:

- Life cycle assessment (LCA) and its relevant application to value chain assessment: European Platform on Life cycle assessment (EPLCA, <https://eplca.jrc.ec.europa.eu/>) and making reference to the Environmental footprint method when applying LCA (<https://ec.europa.eu/environment/eussd/smgp/index.htm>);
- Raw materials: Raw materials information system (RMIS, <https://rmis.jrc.ec.europa.eu/>);
- Soil and soil related issues: European Soil Observatory (ESO, <https://ec.europa.eu/jrc/en/eu-soil-observatory>);
- The natural capital accounting: INCA platform (<https://ec.europa.eu/eurostat/ecosystem-accounts>).
- Strategic Energy Technologies Information System: SETIS ([https://setis.ec.europa.eu/index\\_en](https://setis.ec.europa.eu/index_en));
- The Transport Research and Innovation Monitoring and Information System: TRIMIS (<https://trimis.ec.europa.eu/>);
- The Energy and Industry Geography Lab: EIGL (<https://energy-industry-geolab.jrc.ec.europa.eu/>).
- The Innovation Centre for Industrial Transformation and Emissions (INCITE) (<https://innovation-centre-for-industrial-transformation.ec.europa.eu/>).

As regards the technology progress monitoring against the European Green Deal Objectives, all actions related to **hydrogen and fuel cells** funded under this work programme should report directly or indirectly on an annual basis in a secure online data collection platform managed by the Clean Hydrogen Joint Undertaking and the European Commission<sup>17</sup>. The reporting should consist of filling in the template questionnaire(s) relevant to the project content (and the technology development and TRL).

### **Specific requirements for Societal Readiness pilot projects:**

Understanding and responding to the needs and concerns of societal actors continues to be a priority for European Commission funded research<sup>18</sup>. In Cluster 5 Work Programme 2025, a

<sup>15</sup> The catalogue of European Strategy Forum on Research Infrastructures (ESFRI) research infrastructures portfolio can be browsed from ESFRI website <https://ri-portfolio.esfri.eu/>

<sup>16</sup> The ERIC Landscape <https://www.eric-forum.eu/the-eric-landscape/>

<sup>17</sup> [https://www.clean-hydrogen.europa.eu/knowledge-management/annual-data-collection\\_en](https://www.clean-hydrogen.europa.eu/knowledge-management/annual-data-collection_en)

<sup>18</sup> <https://eur-lex.europa.eu/eli/reg/2021/695/oj>: See preamble point 51

Societal Readiness approach is being advanced as one of the ways to deepen relationships between R&I and society. A number of topics<sup>19</sup> within the Work Programme 2025 have been selected as vanguard for advancing Societal Readiness practices. To support this work, the Commission has setup a common methodology for applicants. The outcomes of this Cluster 5 endeavour in Societal Readiness will be closely assessed and analysed by a dedicated Coordination and Support Action *HORIZON-CL5-2025-03-D2-09: Monitoring, Coordination and Evaluation of the Societal Readiness Pilot*.

The Societal Readiness approach aims, when integrated into R&I processes, to improve the consideration of different societal needs and concerns and to respond to them, thereby increasing the potential for societal uptake. To achieve this, all types of project partners – including Science, Technology, Engineering and Mathematics (STEM) and Social Sciences and Humanities (SSH) profiles – should be engaged in genuine and sustained ways. Inclusive participation early in proposal development and throughout the project will enable an interdisciplinary approach serving the objectives of the topic.

Definitions related to this Societal Readiness pilot can be found in the Horizon Europe Programme Guide<sup>20</sup> (see chapters on ‘*Social Sciences and Humanities*’, *Societal Readiness*’ and ‘*Responsible Research and Innovation*’ in particular).

Proposals submitted for topics that request to follow the Societal Readiness approach are expected to meet all the requirements listed below:

- Resources should be meaningfully distributed to cover project activities associated with advancing Societal Readiness. Societal Readiness considerations should be integrated transversally into the proposal, either in a set of tasks across work packages associated with the R&I work, or in the form of a transversal work package.
- The consortium should bring sufficient expertise to support Societal Readiness activities via the inclusion of partners with appropriate expertise from SSH disciplines<sup>21</sup>. Those partners will facilitate the socio-technical interface and enable the design of project objectives, work packages and tasks compatible with Societal Readiness related activities.
- Partners from all types and disciplines in the consortium should be included in Societal Readiness tasks, where relevant, building on interdisciplinarity efforts to facilitate knowledge integration.

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<sup>19</sup> HORIZON-CL5-2025-03-D1-06; HORIZON-CL5-2025-02-D3-04; HORIZON-CL5-2025-05-D4-02; HORIZON-CL5-2025-01-D5-01; HORIZON-CL5-2025-04-D6-01; HORIZON-CL5-2025-04-D6-02; HORIZON-CL5-2025-04-D6-11

<sup>20</sup> [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/programme-guide\\_horizon\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/programme-guide_horizon_en.pdf)

<sup>21</sup> For example, profiles with experience in addressing social and cultural perspectives, methodological knowledge to e.g., conduct and analyse interviews, design, and lead co-creation, facilitate inclusion, or otherwise meaningfully support the consideration of and responsiveness to societal needs and concerns.

- Proposals should clearly address, under section 1.2 *Methodology*, how the project will integrate Societal Readiness throughout the proposed work, by demonstrating the uptake of the Societal Readiness guiding questions relevant to the subject (see section below).
- Proposals should allocate reasonable resources as part of a dedicated task to engage with the Coordinating and Support Action funded under *HORIZON-CL5-2025-03-D2-09* (e.g., participation in physical format to annual workshops, availability to reply to interviews, punctual exchanges with other Societal Readiness pilot projects). Travel costs to attend physical workshops will be covered by topic *HORIZON-CL5-2025-03-D2-09*.
- A public report called *First report on Societal Readiness* should be delivered within the first six months of the project. The report will build on the Societal Readiness approach for the project as set out in its proposal. It should primarily focus on the project's vision for and approach to Societal Readiness; reflections on initial impressions of societal needs and concerns as connected to the project; preliminary responses to the guiding questions; more detailed plans on how Societal Readiness will be addressed (e.g., time plans, roles and responsibilities, relation to tasks/work packages, anticipated results and how these will be integrated into the project activities).
- A public report called *Final report on Societal Readiness* should be delivered within the last three months of the project. The report will reflect upon the project's experience with implementing Societal Readiness approaches; any differences in experience between expected and actual outcomes; challenges and lessons learned from successful or unsuccessful efforts; ways in which different societal actors were identified and engaged in an interdisciplinary setting, as well as these actors needs and concerns considered, identified, and responded to; and recommendations for future projects on similar thematic areas. The *Final report on Societal Readiness* is expected to directly address the questions identified in the *First report on Societal Readiness*.

The standard template of the Application Form remains unchanged, and its page limit is increased by two additional pages. The proposed work is expected to reflect an integration of Societal Readiness consideration into the overall project design.

### **Responsible Research and Innovation (RRI) guiding questions:**

The following guiding questions<sup>22</sup> are offered to support project teams in considering and integrating a Societal Readiness approach in proposals and, subsequently, in projects' implementation. Consideration of questions in the proposal stage helps to ensure a consortium is well positioned to advance Societal Readiness during project implementation. This

<sup>22</sup> The questions that follow are condensed from and based on the Societal Readiness Thinking Tool elaborated within the EU-funded project NewHoRRIzon, and subsequently detailed in Bernstein, M. J., Nielsen, M. W., Alnor, E., Brasil, A., Birkving, A. L., Chan, T. T., Griessler, E., de Jong, S., van de Klippe, W., Meijer, I., Yaghmaei, E., Nicolaisen, P. B., Nieminen, M., Novitzky, P., & Mejlgård, N. (2022). The Societal Readiness Thinking Tool: A Practical Resource for Maturing the Societal Readiness of Research Projects. *Science and Engineering Ethics*, 28(1), 6. <https://doi.org/10.1007/s11948-021-00360-3>

consideration includes reflecting upon the four dimensions of Responsible Research and Innovation (RRI) namely reflection, inclusion, anticipation, and responsiveness, as indicated next to each question (see complete definition of RRI in the Horizon Europe Programme Guide<sup>23</sup>). The following guiding questions are offered as a basis for reflection and may be complemented by other considerations specific to the topic's subject.

- **R&I Goals**: How do the objectives and expected results of the proposal reflect and integrate the diverse societal needs or goals of different social groups potentially involved or affected? (*RRI dimensions: reflection, inclusion, responsiveness*)
- **Societal actors**: How does the proposal identify and include key stakeholder groups in activities? If appropriate, how does the proposal identify and include groups often marginalised or excluded from previous or similar initiatives? (*RRI dimensions: reflection, inclusion*)
- **Benefits and burdens**: Who stands to benefit from envisioned activities of the project and their expected impacts? Who stands to bear the burdens (social, environmental, economic or other)? How are the groups bearing these burdens included in and given a voice in the project? How are possible conflicts of interest and uncertainties managed? (*RRI dimensions: anticipation, reflection, responsiveness*)
- **Objections and concerns**: How does the project, through its activities, plan to identify and respond to the objections or concerns of different groups of societal actors? How could potential undesired consequences of activities, results, outcomes, or impacts be anticipated? How could such consequences be avoided? (*RRI dimensions: reflection, inclusion, anticipation, responsiveness*)

#### **Evaluation of the Societal Readiness aspect:**

Societal Readiness will be assessed in the same way as other aspects that belong to 'Methodology' within the Excellence section of the Application form. During the evaluation, all comments under the "Excellence" criterion will be consolidated so that a mark out of five points is issued, which reflects the overall score of the proposal for the "Excellence" evaluation criterion.

<sup>23</sup>

[https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/programme-guide\\_horizon\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/programme-guide_horizon_en.pdf)

## Calls for proposals

### Call - Cluster 5 Call 01-2025 (WP 2025)

**HORIZON-CL5-2025-01**

#### Overview of this call<sup>24</sup>

Proposals are invited against the following Destinations and topic(s):

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million) <sup>25</sup>	Indicative number of projects expected to be funded			
		2025					
Opening: 06 May 2025							
Deadline(s): 04 Sep 2025							
Clean and competitive solutions for all transport modes							
HORIZON-CL5-2025-01-D5-01: Efficient wireless stationary bidirectional charging solutions for road Light Duty Vehicles (2ZERO Partnership) – Societal Readiness Pilot	IA	20.00	Around 10.00	2			
HORIZON-CL5-2025-01-D5-02: Cybersecure and resilient road e-mobility ecosystem (2ZERO Partnership)	IA	10.00	Around 10.00	1			
HORIZON-CL5-2025-01-D5-03: Safe post-crash management of road Light Duty Battery Electric Vehicles (BEVs) (2ZERO Partnership)	IA	5.00	Around 5.00	1			
HORIZON-CL5-2025-01-D5-04: Extended lifetime of road Battery Electric Vehicles	RIA	7.00	Around 7.00	1			

<sup>24</sup> The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.

The Director-General responsible may delay the deadline(s) by up to two months.

All deadlines are at 17.00.00 Brussels local time.

The budget amounts are subject to the availability of the appropriations provided for in the general budget of the Union for 2025.

<sup>25</sup> Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

(BEV) (2ZERO Partnership)				
HORIZON-CL5-2025-01-D5-05: Road Battery Electric Vehicles (BEV) optimised user-centric solutions for energy efficiency design and consistent range throughout weather conditions (2ZERO Partnership)	IA	12.00	Around 6.00	2
HORIZON-CL5-2025-01-D5-06: Strategies, tools and concepts for optimised road Battery Electric Vehicles (BEV) long-haul logistics use cases (2ZERO Partnership)	IA	5.00	Around 5.00	1
HORIZON-CL5-2025-01-D5-07: Accelerating the transformation towards a circular automotive industry	CSA	2.00	Around 2.00	1
HORIZON-CL5-2025-01-D5-08: Next generation testing capabilities in strategic EU wind tunnels	RIA	15.00	Around 15.00	1
HORIZON-CL5-2025-01-D5-09: Next generation aircraft autonomy technologies for cockpit / pilot assistance applications	RIA	7.00	Around 3.50	2
HORIZON-CL5-2025-01-D5-10: Innovative solutions for energy conversion and safety of low and zero-carbon fuels in waterborne transport (ZEWWT Partnership)	IA	22.50	Around 11.25	2
HORIZON-CL5-2025-01-D5-11: Demonstration of battery energy storage systems in existing and new vessels via novel energy storage and ship design concepts (ZEWWT Partnership)	IA	15.00	Around 7.50	2
HORIZON-CL5-2025-01-D5-12: Real-time, adaptative and innovative energy management solutions to optimise fuel consumption and lower emissions pollutants in waterborne transport (ZEWWT Partnership)	RIA	4.00	Around 4.00	1
HORIZON-CL5-2025-01-D5-13: Novel holistic intelligent tools for variable retrofit and decarbonised scenarios (ZEWWT Partnership)	IA	4.00	Around 4.00	1
HORIZON-CL5-2025-01-D5-14: Flexible and	IA	5.00	Around	1

mobile solutions for Onshore Power Supply (ZEW'T Partnership)			5.00	
HORIZON-CL5-2025-01-D5-15: Optimal integrated onboard renewable energy solutions, by considering wind-powered and hull performance technologies (ZEW'T Partnership)	IA	7.50	Around 7.50	1
HORIZON-CL5-2025-01-D5-16: Support of the new EU renewable and low carbon fuel ecosystem for waterborne transport	CSA	2.00	Around 2.00	1
HORIZON-CL5-2025-01-D5-18: Support to the organisation and dissemination of the Transport Research Arena (TRA) conference	CSA	1.60	Around 1.60	1
HORIZON-CL5-2025-01-D5-19: Increased participation, knowledge sharing, dissemination and implementation support to strengthen the European road transport R&I landscape in Europe and around the World, increasing its global competitiveness	CSA	2.00	Around 2.00	1
<b>Safe, Resilient Transport and Smart Mobility services for passengers and goods</b>				
HORIZON-CL5-2025-01-D6-01: Advancing remote operations to enable the sustainable and smart mobility of people and goods based on operational and societal needs (CCAM Partnership) – Societal Readiness Pilot	RIA	12.00	Around 6.00	2
HORIZON-CL5-2025-01-D6-02: Preparing for large-scale CCAM demonstrations (CCAM Partnership) – Societal Readiness Pilot	CSA	4.00	Around 4.00	1
HORIZON-CL5-2025-01-D6-11: Innovative air mobility and services for sustainable and smart urban, peri-urban transport – Societal Readiness pilot	RIA	10.00	Around 5.00	2
HORIZON-CL5-2025-01-D6-12: Safe Human-Technology Interaction (HTI) in the vehicle systems of the coming decade – Societal Readiness Pilot	IA	8.00	Around 4.00	2
Overall indicative budget		180.60		

<b>General conditions relating to this call</b>	
<i>Admissibility conditions</i>	The conditions are described in General Annex A.
<i>Eligibility conditions</i>	The conditions are described in General Annex B.
<i>Financial and operational capacity and exclusion</i>	The criteria are described in General Annex C.
<i>Award criteria</i>	The criteria are described in General Annex D.
<i>Documents</i>	The documents are described in General Annex E.
<i>Procedure</i>	The procedure is described in General Annex F.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G.

## Call - Cluster 5 Call 02-2025 (WP 2025)

**HORIZON-CL5-2025-02**

### Overview of this call<sup>26</sup>

Proposals are invited against the following Destinations and topic(s):

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million) <sup>27</sup>	Indicative number of projects expected to be funded
		2025		
Opening: 06 May 2025				

<sup>26</sup> The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.

The Director-General responsible may delay the deadline(s) by up to two months.

All deadlines are at 17.00.00 Brussels local time.

The budget amounts are subject to the availability of the appropriations provided for in the general budget of the Union for 2025.

<sup>27</sup> Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

Deadline(s): 16 Sep 2025					
Cross-sectoral solutions for the climate transition					
HORIZON-CL5-2025-02-D2-02: Cost-effective next-generation batteries for long-duration stationary storage (Batt4EU Partnership)	RIA	15.00	Around 5.00	3	
HORIZON-CL5-2025-02-D2-03: Sustainable processing and refining of raw materials to produce battery grade Li-ion battery materials (Batt4EU Partnership)	IA	20.00	Around 10.00	2	
HORIZON-CL5-2025-02-D2-06: Fostering the European battery Ecosystem by providing Accurate and up-to-date information and stimulating Excellence in the European battery R&I community (Batt4EU Partnership)	CSA	3.00	Around 3.00	1	
HORIZON-CL5-2025-02-D2-10: Clean Energy Transition Co-Funded Partnership	COFUND	69.00	Around 69.00	1	
HORIZON-CL5-2025-02-D2-11: Support to the SET Plan community	CSA	7.50	Around 0.50	15	
HORIZON-CL5-2025-02-D2-12: NZIA regulatory sandbox exchange forum support	CSA	0.50	Around 0.50	1	
HORIZON-CL5-2025-02-D2-13: Placeholder: Joint topic with India on waste to renewable hydrogen	RIA		N/A	Not relevant	
Sustainable, secure and competitive energy supply					
HORIZON-CL5-2025-02-D3-03: Novel approaches to geothermal resources development	IA	20.00	Around 10.00	2	
HORIZON-CL5-2025-02-D3-04: Development of hydropower technologies and water management schemes allowing for win-win situation of flexible hydropower and biodiversity improvement – Societal Readiness Pilot	RIA	12.00	Around 4.00	3	

HORIZON-CL5-2025-02-D3-06: Innovative manufacturing of wind energy technologies	IA	21.00	Around 7.00	3
HORIZON-CL5-2025-02-D3-09: Optimised/Alternative Silicon Growth Technologies (from either liquid or gaseous phase) for PV Applications (EUPI-PV Partnership)	IA	18.00	Around 9.00	2
HORIZON-CL5-2025-02-D3-11: Novel inverter technologies and flexibility in PV systems (EUPI-PV Partnership)	IA	18.00	Around 6.00	3
HORIZON-CL5-2025-02-D3-15: Building a Long-Term Africa Union (AU) and European Union (EU) Research and Innovation joint collaboration on Sustainable Renewable Energies	CSA	4.00	Around 4.00	1
HORIZON-CL5-2025-02-D3-16: Support to the BRIDGE initiative	CSA	1.00	Around 1.00	1
HORIZON-CL5-2025-02-D3-17: Control and operation tools for a RES-based energy system	IA	20.00	Around 10.00	2
HORIZON-CL5-2025-02-D3-21: Cross-regional network and market model for optimisation of long duration storage	RIA	14.00	Around 7.00	2
HORIZON-CL5-2025-02-D3-23: Critical elements for energy security of grid and storage technologies	RIA	9.00	Around 3.00	3
HORIZON-CL5-2025-02-D3-25: Effects of CO2-stream impurities on CO2 transport and storage	RIA	10.00	Around 5.00	2
HORIZON-CL5-2025-02-D3-26: European investment atlas of potential CO2 storage sites	RIA	5.00	Around 5.00	1
HORIZON-CL5-2025-02-D3-27: Using captured CO2 as a resource to replace fossil fuels in industrial production	IA	14.00	Around 7.00	2

Overall indicative budget	281.00		
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**General conditions relating to this call**

<i>Admissibility conditions</i>	The conditions are described in General Annex A.
<i>Eligibility conditions</i>	The conditions are described in General Annex B.
<i>Financial and operational capacity and exclusion</i>	The criteria are described in General Annex C.
<i>Award criteria</i>	The criteria are described in General Annex D.
<i>Documents</i>	The documents are described in General Annex E.
<i>Procedure</i>	The procedure is described in General Annex F.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G.

**Call - Cluster 5 Call 03-2025 (WP 2025)**

**HORIZON-CLS-2025-03**

**Overview of this call<sup>28</sup>**

Proposals are invited against the following Destinations and topic(s):

Topics	Type of Action	Budgets	Expected EU contribution per project	Indicative number of projects expected to be
		(EUR million)	(EUR million) <sup>29</sup>	

<sup>28</sup> The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.

The Director-General responsible may delay the deadline(s) by up to two months.

All deadlines are at 17.00.00 Brussels local time.

The budget amounts are subject to the availability of the appropriations provided for in the general budget of the Union for 2025.

<sup>29</sup> Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

				funded
Opening: 06 May 2025				
Deadline(s): 24 Sep 2025				
Climate sciences and responses for the transformation towards climate neutrality				
HORIZON-CL5-2025-03-D1-01: Climate simulations data and knowledge for optimal support of IPCC Assessments and International Policy	RIA	30.00	Around 30.00	1
HORIZON-CL5-2025-03-D1-02: Advancing Earth System Models to increase understanding of Earth system change	RIA	15.00	Around 7.50	2
HORIZON-CL5-2025-03-D1-03: Modelling of mitigation pathways for F-gases	RIA	7.50	2.50 to 3.00	3
HORIZON-CL5-2025-03-D1-04: The attribution to climate change, and improved forecasting of extreme and slow-onset climate- and weather-related events and their impacts	RIA	12.00	Around 6.00	2
HORIZON-CL5-2025-03-D1-05: Adaptation to Climate Change: Effectiveness and Limits	RIA	18.00	Around 6.00	3
HORIZON-CL5-2025-03-D1-06: Fostering equity and justice in climate policies – Societal Readiness Pilot	RIA	15.00	4.00 to 5.00	3
HORIZON-CL5-2025-03-D1-07: Implementing the climate action pillar of the EU-African Union Partnership on Climate Change and Sustainable Energy	CSA	4.00	3.00 to 4.00	1
Cross-sectoral solutions for the climate transition				
HORIZON-CL5-2025-03-D2-08: Driving Urban Transition Co-Funded Partnership	COFUND	56.00	Around 56.00	1
Overall indicative budget		157.50		

<b>General conditions relating to this call</b>	
<i>Admissibility conditions</i>	The conditions are described in General Annex A.
<i>Eligibility conditions</i>	The conditions are described in General Annex B.
<i>Financial and operational capacity and exclusion</i>	The criteria are described in General Annex C.
<i>Award criteria</i>	The criteria are described in General Annex D.
<i>Documents</i>	The documents are described in General Annex E.
<i>Procedure</i>	The procedure is described in General Annex F.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G.

## Call - Cluster 5 Call 01-2026 (WP 2025)

**HORIZON-CL5-2026-01**

### Overview of this call<sup>30</sup>

Proposals are invited against the following Destinations and topic(s):

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million) <sup>31</sup>	Indicative number of projects expected to be funded	
		2025			
Opening: 16 Sep 2025					
Deadline(s): 13 Jan 2026					

<sup>30</sup> The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.

The Director-General responsible may delay the deadline(s) by up to two months.

All deadlines are at 17.00.00 Brussels local time.

The budget amounts are subject to the availability of the appropriations provided for in the general budget of the Union for 2025.

<sup>31</sup> Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

Cross-sectoral solutions for the climate transition				
HORIZON-CL5-2026-01-D2-01: Development of sustainable and design-to-cost batteries with (energy-)efficient manufacturing processes and based on advanced and safer materials (Batt4EU Partnership)	IA	24.00	Around 8.00	3
HORIZON-CL5-2026-01-D2-04: Integrating advanced material, cell design and manufacturing development for high-performance batteries aimed at mobility (Batt4EU Partnership)	RIA	30.00	Around 10.00	3
HORIZON-CL5-2026-01-D2-05: Accelerated multi-physical and virtual testing for battery aging, reliability, and safety evaluation (Batt4EU Partnership)	IA	15.00	Around 7.50	2
HORIZON-CL5-2026-01-D2-07: Joint topic with India on recycling of EV batteries	RIA		N/A	Not relevant
HORIZON-CL5-2025-03-D2-09: Monitoring and Evaluation of the Societal Readiness Pilot	CSA	1.50	Around 1.50	1
Clean and competitive solutions for all transport modes				
HORIZON-CL5-2026-01-D5-17: Real time monitoring of regulated and non-regulated emissions from all types of vessels and other port activities in order to enforce emission limits in waterfront cities	IA		Around 8.00	2
Safe, Resilient Transport and Smart Mobility services for passengers and goods				
HORIZON-CL5-2026-01-D6-03: Next-generation environment perception for real world CCAM operations: Error-free and secure technologies to improve energy-efficiency, cost-effectiveness, and circularity (CCAM Partnership)	RIA	8.00	Around 4.00	2
HORIZON-CL5-2026-01-D6-04: Integration of human driving behaviour in the validation of CCAM systems (CCAM Partnership)	RIA	5.00	Around 5.00	1
HORIZON-CL5-2026-01-D6-05: Approaches, verification and training for Edge-AI building	RIA	4.00	Around	1

blocks for CCAM Systems (CCAM Partnership)			4.00	
HORIZON-CL5-2026-01-D6-06: Federated CCAM data exchange platform (CCAM Partnership)	IA	4.00	Around 4.00	1
HORIZON-CL5-2026-01-D6-07: Innovative construction and maintenance, with the use of new materials and techniques, for resilient and sustainable transport infrastructure	IA	22.00	Around 11.00	2
HORIZON-CL5-2026-01-D6-08: Accelerating freight transport and logistics digital innovation	IA	15.00	7.00 to 8.00	2
HORIZON-CL5-2026-01-D6-09: Reliable data and practices to measure and calculate transport emissions in multimodal transport chains	CSA	3.50	Around 3.50	1
HORIZON-CL5-2026-01-D6-10: Integrating inland waterway transport in smart shipping and multimodal logistics chains	IA	16.00	Around 8.00	2
HORIZON-CL5-2026-01-D6-13: Safety of Cyclists, Pedestrians and Users of Micromobility Devices	RIA	10.00	Around 5.00	2
HORIZON-CL5-2026-01-D6-14: Predicting and avoiding road crashes based on Artificial Intelligence (AI) and big data	RIA	10.00	Around 5.00	2
HORIZON-CL5-2026-01-D6-15: Icing in the context of sustainable aviation	RIA	4.00	Around 4.00	1
Overall indicative budget		172.00		

<b>General conditions relating to this call</b>	
<i>Admissibility conditions</i>	The conditions are described in General Annex A.
<i>Eligibility conditions</i>	The conditions are described in General Annex B.
<i>Financial and operational capacity and</i>	The criteria are described in General Annex

<i>exclusion</i>	C.
<i>Award criteria</i>	The criteria are described in General Annex D.
<i>Documents</i>	The documents are described in General Annex E.
<i>Procedure</i>	The procedure is described in General Annex F.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G.

## Call - Cluster 5 Call 02-2026 (WP 2025)

**HORIZON-CL5-2026-02**

### Overview of this call<sup>32</sup>

Proposals are invited against the following Destinations and topic(s):

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million) <sup>33</sup>	Indicative number of projects expected to be funded			
		2025					
Opening: 16 Sep 2025							
Deadline(s): 17 Feb 2026							
Sustainable, secure and competitive energy supply							
HORIZON-CL5-2026-02-D3-01: Large-scale production of liquid advanced biofuels and renewable fuels of non-biological origin	IA	33.00	Around 11.00	3			
HORIZON-CL5-2026-02-D3-02:	RIA	8.00	Around	2			

<sup>32</sup> The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.

The Director-General responsible may delay the deadline(s) by up to two months.

All deadlines are at 17.00.00 Brussels local time.

The budget amounts are subject to the availability of the appropriations provided for in the general budget of the Union for 2025.

<sup>33</sup> Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

Competitiveness, energy security and integration aspects of advanced biofuels and renewable fuels of non-biological origin value chains			4.00	
HORIZON-CL5-2026-02-D3-05: Demonstration of thermal energy storage solutions for solar thermal plants and systems	IA	15.00	Around 7.50	2
HORIZON-CL5-2026-02-D3-07: Improved reliability and optimised operations and maintenance for wind energy systems	RIA	15.00	Around 5.00	3
HORIZON-CL5-2026-02-D3-08: Understand and minimise the environmental impacts of offshore wind energy	RIA	15.00	Around 5.00	3
HORIZON-CL5-2026-02-D3-10: Towards commercialisation of Perovskite PV and development of dedicated manufacturing equipment (EUPI-PV Partnership)	IA	18.00	Around 9.00	2
HORIZON-CL5-2026-02-D3-12: Extending the lifetime of crystalline silicon PV modules (EUPI-PV Partnership)	RIA	8.00	Around 4.00	2
HORIZON-CL5-2026-02-D3-13: De-risking wave energy technology development through transnational pre-commercial procurement of Wave energy research and development	PCP	20.00	Around 20.00	1
HORIZON-CL5-2026-02-D3-14: Development of innovative solutions strengthening the security of renewable energy value chains	CSA	6.00	Around 2.00	3
HORIZON-CL5-2026-02-D3-18: Next generation distribution substation for increasing the system resilience	IA	18.00	Around 9.00	2
HORIZON-CL5-2026-02-D3-19: Innovation solutions for a generative AI-powered digital spine of the EU energy system	IA	16.00	Around 8.00	2
HORIZON-CL5-2026-02-D3-20: Innovative tools and services to manage and empower energy communities	IA	20.00	Around 10.00	2

HORIZON-CL5-2026-02-D3-22: Underground Thermal Energy Storage in dense urban areas	IA	18.00	Around 9.00	2
HORIZON-CL5-2026-02-D3-24: New CO2 capture technologies	RIA	18.00	Around 6.00	3
Efficient, sustainable and inclusive energy use				
HORIZON-CL5-2026-02-D4-01: On-site innovative robotics and automated solutions and techniques for more sustainable and less disruptive building renovation and construction	RIA	15.00	Around 5.00	3
HORIZON-CL5-2026-02-D4-02: Smarter buildings as part of the energy system for increased efficiency and flexibility – Societal Readiness Pilot	IA	12.00	Around 4.00	3
HORIZON-CL5-2026-02-D4-03: Innovative pathways for low carbon and climate resilient building stock and built environment (Built4People Partnership)	RIA	15.00	Around 5.00	3
HORIZON-CL5-2026-02-D4-04: Innovative approaches for the deployment of Positive Energy Districts	IA	15.00	Around 5.00	3
HORIZON-CL5-2026-02-D4-05: Optimal combination of low embodied carbon construction products, technical building systems and circularity principles for climate neutral buildings (Built4People Partnership)	RIA	12.00	Around 4.00	3
HORIZON-CL5-2026-02-D4-06: Phase out fossil fuel in energy intensive industries through the integration of renewable energy sources	IA	15.00	Around 7.50	2
Overall indicative budget		312.00		

**General conditions relating to this call**

<i>Admissibility conditions</i>	The conditions are described in General Annex A.
<i>Eligibility conditions</i>	The conditions are described in General Annex B.

<i>Financial and operational capacity and exclusion</i>	The criteria are described in General Annex C.
<i>Award criteria</i>	The criteria are described in General Annex D.
<i>Documents</i>	The documents are described in General Annex E.
<i>Procedure</i>	The procedure is described in General Annex F.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G.

## Destinations

### Climate sciences and responses for the transformation towards climate neutrality

This Destination contributes directly to the Strategic Plan's **Key Strategic Orientations** 'Green transition', 'Digital transition' and 'A more resilient, competitive, inclusive and democratic Europe'.

In line with the Strategic Plan, the overall **expected impact** of this Destination is to contribute to the "*Advancing science for a transition to a climate-neutral and resilient society*".

Advancing climate science and the knowledge base necessary to underpin actionable solutions is essential for catalysing the global transition to a climate-neutral and climate-resilient society. Evidence on research gaps of high policy relevance can be found in the European Climate Risk Assessment (EUCRA)<sup>34</sup>, and in the report "The Next frontier for Climate Change Science"<sup>35</sup>.

Research should contribute to closing major knowledge gaps on the changing climate together with their associated impacts and risks, on both society and nature, and to developing tools to support decision-makers in designing and implementing effective mitigation and adaptation actions at various time and spatial scales while properly accounting for synergies and trade-offs with other policy objectives, such as biodiversity, industrial competitiveness, just transition and leaving no one behind. Notably, state-of-art scientific evidence will be increasingly vital to guide policy decisions aimed at safeguarding long-term societal welfare and EU's economic resilience as climate change impacts increase. Tailored scientific approaches that take into account disparities between regions, countries, communities and diverse groups within society, are needed, to understand how they are affected by global warming and what array of response options is available to them.

The first objective is to **support and accelerate climate action (both mitigation and adaptation) globally** by:

- Improved knowledge of the Earth system, its recent evolution and future responses under different global emissions pathways and socio-economic scenarios;
- Increased understanding of the interrelated impacts between climate change, human and natural systems, including from compound, cascading and tail risks, improving the attribution to anthropogenic factors, and leveraging the role of climate services for effective adaptation and response strategies;
- Well-designed and evaluated solutions and pathways for climate-resilient, low-greenhouse gas-emission development enabling just societal transformation while

<sup>34</sup>

European Climate Risk Assessment — European Environment Agency (europa.eu)

<sup>35</sup>

[The Next Frontier for Climate Change Science: Insights from authors of the IPCC 6th Assessment Report on knowledge gaps and priorities for research](#)

promoting citizen and stakeholder involvement, climate literacy and integration of natural and social sciences;

- Increased synergies with the EU Mission on Adaptation to Climate Change, by generating actionable knowledge in support of transformative adaptation.

The second objective contributes substantially to key international assessments by closing key knowledge gaps related to climate change. Such assessments include the ones by the Intergovernmental Panel on Climate Change (IPCC), the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the Scientific Assessment of Ozone Depletion and initiatives such as the Coupled Model Intercomparison Project (CMIP) and the Coordinated Regional Climate Downscaling Experiment (CORDEX) under the World Climate Research Programme (WCRP).

The third objective is a **strengthened European Research Area on climate change** by boosting scientific excellence and capacity in an inclusive manner across the participating countries.

The fourth objective is the **maximisation of synergies with other policy priorities** such as biodiversity and ecosystem preservation and restoration, just transition, just resilience, pollution reduction, health and well-being, resource conservation, circularity, and the Sustainable Development Goals by exploring co-benefits, trade-offs and potential unintended consequences of climate strategies and policy interventions.

Strong links exist with activities funded under Cluster 6 on climate-ocean-polar-cryosphere nexus, and in Cluster 3 on disaster risk reduction, and with the Mission on Adaptation to Climate Change. The results of research funded under this Destination, in particular those informing the design of effective mitigation and adaptation pathways, are also highly relevant for other EU Missions on Climate-Neutral and Smart Cities, on Soil, and on Ocean and Water.

Proposals are invited against the following topic(s):

**HORIZON-CL5-2025-03-D1-01: Climate simulations data and knowledge for optimal support of IPCC Assessments and International Policy**

<b>Call: Cluster 5 Call 03-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 30.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 30.00 million.

<i>Type of Action</i>	Research and Innovation Actions
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Beneficiaries may provide financial support to third parties in the context of international cooperation for capacity building purposes (<a href="http://www.fc-scc.org/en/partnership_program/south_south_countries">http://www.fc-scc.org/en/partnership_program/south_south_countries</a>). This support can only be provided in the form of grants to researchers from legal entities established in the Global South countries. The maximum grant amount is EUR 60.000 and the total amount should not be higher than EUR 1.000.000.</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>36</sup></p> <p>Beneficiaries will be subject to the following additional obligations regarding open science practices: Open access to any new modules, models or tools developed from scratch or substantially improved with the use of EU funding under the action must be ensured through documentation, availability of model code and input data developed under the action.</p>

**Expected Outcome:** Project results are expected to contribute to **all of the** following expected outcomes:

- The institutions in charge to generate the relevant information for decision makers can access and utilise in a timely manner scientifically robust climate projections corresponding to a range of future scenarios and their corresponding greenhouse gas emission pathways, including scenarios matching the Paris Agreement targets;
- Decision makers and society can better understand the impacts, risks and implications of pathways involving different magnitudes and durations of temperature overshoot;
- The European research community provides a coordinated contribution to the IPCC and other major scientific initiatives (e.g., IPBES, WCRP, World Adaptation Science Programme (WASP), the Global Carbon Budget), in support of informing the UNFCCC process and other global, European and national climate efforts;
- The activities of international programmes and communities like the Integrated Assessment Modelling Consortium (IAMC), the CMIP, the CORDEX and Inter-Sectoral Impact Model Intercomparison Project (ISIMIP) are better coordinated between each

<sup>36</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

other, with outcomes more consistent and responding to policy needs better and in a timelier manner;

The European contribution to these programmes is supported by an improved and interconnected overarching infrastructure.

**Scope:** Given the rapidly developing climate crisis, there is an increasing need for accurate, reliable, and actionable information at global to local spatial scales, and near to long timescales. This information must support a range of requirements, including policy related ones. In particular, simulations and knowledge delivered that feed into the IPCC, including the Seventh Assessment Report (AR7) and later ones, should be internally coherent and well-coordinated. The modelling, setting, ensemble, and simulation design must be suited to meet societal and policy demands to support timelier European and international climate policy developments. This also implies progressing towards an operational framework to provide the best possible information for societal decision-making that brings together available approaches. The resulting simulations and analysis should sample the full spectrum of climate risks. In particular, as global mitigation efforts are presently insufficient and temperatures continue to rise, the impacts of global warming overshoot on the Earth system and the feasibility, possible pace, and implications of bringing global temperatures down in a sustainable way after an overshoot need to be explored. This analysis should also consider the risks and consequences of potential abrupt and irreversible impacts (e.g., sea level rise, changes in ocean circulation, ocean-acidification, water cycle alterations, soil alterations, aridification, species extinctions, loss of sea ice, glaciers, and ice sheets, and crossing climate and ecological tipping points).

Therefore, actions should address all of the following aspects:

- Generate future global climate projections with state-of-the-art Earth System Models (ESM) which are built on the latest improvements in modelling technologies and in process understanding with a more complete representation of climate–carbon cycle feedback;
- Design climate simulations considering the socio-economic scenarios from the most up to date set of Integrated Assessment Models (IAM). Greenhouse gas emission pathways should be provided based on various societal mitigation and adaptation choices and land-use scenarios. Climate feedback should be also considered. The resulting assessment should link allowable carbon emissions with key climate targets, spanning policy relevant temporal and spatial scales;
- Deliver scenarios and simulations with different levels and durations of warming overshoot (to be selected for their policy relevance), assessing the corresponding risks accounting for fast and slow onset processes and the feasibility and limits of carbon dioxide removal methodologies;
- Update and coordinate the assumptions as well as the observational and simulated climate data sets underpinning the models and experiments of the various climate

science communities (including Earth system, sectoral impacts, adaptation, and mitigation modelers) across international programmes, such as IAMC, CMIP, CORDEX and ISIMIP, optimising the interaction between them as much as possible within the same IPCC cycle;

- Design a framework to coordinate and incorporate the suite of global and regional climate projections, encompassing the range of available model resolutions and model realism, using consistent concentration and emission-driven ESMs, enhancing collaboration between European Earth system modelling and service provision, such as Copernicus and Destination Earth. This system should include cross-analysis and evaluation of the full suite of models, including approaches for sampling projection and scenario uncertainty (e.g., emulators). The framework should also make the modelling results more accessible and understandable to the practitioners and decision makers;
- Improve the existing infrastructure landscape (software, tools, data, adaptation of models to High-Performance Computing (HPC)), to support the delivery of global and regional climate projections and associated analysis (for which a part of the budget may be allocated, but not more than 30% of the total eligible costs). This should be complementary to efforts funded through the European Research Infrastructures, Euro-HPC Joint Undertaking, Digital Europe Programme and other sources. ESM simulations are intended as the core of the topic with links to other modelling activities. To maximise the policy relevance of the climate simulations delivered, the operationalisation framework and the scenarios should be developed in co-creation with policy makers (e.g., through advisory boards or other participatory procedures).

When dealing with models, actions should promote the highest standards of transparency and openness, as much as possible going well beyond documentation and extending to aspects such as assumptions, protocols, code, and data that is managed in compliance with the FAIR principles<sup>37</sup>.

They should envisage clustering activities with any other relevant projects (in<sup>38</sup> and outside of Horizon Europe) for cross-projects cooperation and exchange of results. Proposals should earmark the necessary resources for these purposes. As this endeavour should be supported by the research communities that continuously improve the modelling systems and related infrastructure, strong interaction and coordination with the projects funded under previous calls of this Destination and other relevant projects on ESM, the topic HORIZON-CL5-2025-03-D1-02 “Advancing Earth System Models to increase understanding of Earth system change”, and the topic HORIZON-INFRA-2025-01-SERV-02 (area on Research infrastructure services to improve the understanding and prediction of future climate changes and its impacts) is expected.

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<sup>37</sup> FAIR (Findable, Accessible, Interoperable, Reusable).

<sup>38</sup> For example, relevant projects funded under the Horizon Europe calls Climate sciences and responses.

International cooperation is encouraged, in particular with the Global South<sup>39</sup>, to promote capacity and consensus building, for example, by training early career researchers.

**HORIZON-CL5-2025-03-D1-02: Advancing Earth System Models to increase understanding of Earth system change**

Call: Cluster 5 Call 03-2025 (WP 2025)	
Specific conditions	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 7.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 15.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>40</sup>.</p> <p>Beneficiaries will be subject to the following additional obligations regarding open science practices: Open access to any new modules, models or tools developed from scratch or substantially improved with the use of EU funding under the action must be ensured through documentation, availability of model code and input data developed under the action.</p>

Expected Outcome: Project results are expected to contribute to **all of the** following expected outcomes:

- Advanced understanding and capability to predict the future evolution of the Earth system, at global to local spatial scales and from weather to climate timescales, including the socio-economic and environmental impacts of these changes;

<sup>39</sup> [http://www.fc-ssc.org/en/partnership\\_program/south\\_south\\_countries](http://www.fc-ssc.org/en/partnership_program/south_south_countries)

<sup>40</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

- Advanced understanding and capability to predict regional climate variability, including extreme events and regional water cycle, in particular, regional precipitation;
- Strengthened collaboration and cross-fertilisation across available approaches to Earth system and climate modelling science, enabling a joint contribution to the next generation of Earth system models (ESMs);
- Long-term science, modelling and evidence base to support European and international policies are advanced.

**Scope:** ESMs are the primary tools used for assessing future changes in the climate system. They have increased in their resolution and realism over the past two decades. Despite these advances, there remain several poorly understood and simulated processes, interactions and feedbacks that limit their ability to deliver accurate predictions and projections of global and regional Earth system change, and to aid understanding and quantifying future climate variability. Specially challenging is how variability interacts with extreme events (including compound ones), in particular related to precipitation and water availability (both excess and scarcity).

Actions should address all of the following aspects:

1. Improving the simulation of the coupled Earth system and its sensitivity to natural and anthropogenic forcings, with a better representation of key Earth system and climate feedbacks and processes, including, among others, some of the following advances:
  - o The interplay between global change, regional climate variability, and changes in climate and weather extremes;
  - o Terrestrial-ocean-climate interactions;
  - o Coupled climate-carbon-water cycle feedbacks;
  - o Coupled climate-ocean-ice interactions;
  - o Aerosol-cloud-climate forcing and feedback;
  - o Climate-vegetation-fire interactions;
  - o Climate-air quality interactions;
  - o Interactions between land use scenarios (in terms of changes in the land use and surface, such as those related to carbon dioxide removal, with consequences on the water and carbon cycles, albedo and aerosols) and regional climate.
2. Increased collaboration across different model development approaches encompassing the range of available model resolutions and model realism.
3. Bring together and further improve existing and new observational and reanalysis datasets, models, emulators, and analysis tools to facilitate rapid and in-depth bias

identification, model calibration and validation, and evaluation and understanding of model simulations.

Actions should exploit the opportunities offered by state of art digital technologies such as machine learning, big data analytics or Artificial Intelligence (AI). They should promote the highest standards of transparency and openness, extending to aspects such as assumptions, protocols, code, and data that is managed in compliance with the FAIR principles<sup>41</sup>. Beneficiaries of EU funding are required to publish results data in open access repositories and/or as annexes to publications, and provide full openness of any new modules, models or tools developed from scratch or substantially improved. Projects should take into account, during their lifetime, relevant activities and initiatives for ensuring and improving the quality of scientific software and code.

All projects funded under this topic are strongly encouraged to connect, coordinate, and participate in networking, intercomparison and joint activities to exploit synergies and maximise complementarities between them. They should envisage clustering activities with any other relevant projects (in<sup>42</sup> and outside of Horizon Europe) for cross-projects cooperation and exchange of results. Proposals should earmark the necessary resources for these purposes. Results from relevant past and ongoing projects from previous calls of this Destination and other relevant projects on ESM should be considered and strong feedback and coordination with projects funded under the topics HORIZON-CL5-2025-03-D1-01 “Climate simulations data and knowledge for optimal support of IPCC Assessments and International Policy” and HORIZON-INFRA-2025-01-SERV-02 (area on research infrastructure services to improve the understanding and prediction of future climate changes and their impact) is expected.

### **HORIZON-CL5-2025-03-D1-03: Modelling of mitigation pathways for F-gases**

<b>Call: Cluster 5 Call 03-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of between EUR 2.50 and 3.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 7.50 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Legal and financial set-up of the Grant</i>	The rules are described in General Annex G. The following exceptions apply: Eligible costs will take the form of a lump sum as defined in the

<sup>41</sup> FAIR (Findable, Accessible, Interoperable, Reusable).

<sup>42</sup> For example, relevant projects funded under the Horizon Europe calls Climate sciences and responses.

<i>Agreements</i>	<p>Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). <sup>43</sup>.</p> <p>Beneficiaries will be subject to the following additional obligations regarding open science practices: Open access to any new modules, models or tools developed from scratch or substantially improved with the use of EU funding under the action must be ensured through documentation, availability of model code and input data developed under the action.</p>
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**Expected Outcome:** Project results are expected to contribute to **all** of the following expected outcomes:

- Improved knowledge of regional pathways concerning the use of Ozone Depleting Substances and Fluorinated Greenhouse Gases, options to mitigate this use, the resulting emissions, and how this interacts with the decarbonisation of the energy system;
- Improved modelling capacity regarding the use of Ozone Depleting Substances and Fluorinated Greenhouse Gases in the refrigeration, air conditioning and heat pump sectors, in a manner that increases the availability to Parties to the Montreal Protocol<sup>44</sup> of modelling tools to inform them on policy options for an ambitious implementation of the Kigali Agreement<sup>45</sup>, including a transition to natural refrigerants, and how this interacts with the decarbonisation of the energy system.

**Scope:** Fluorinated greenhouse gases are the fastest growing group of greenhouse gas emissions globally. The Montreal Protocol resulted in decreasing use and emissions of Ozone Depleting Substances and will now also regulate a phasedown of hydrofluorocarbons (HFCs), representing the largest share of fluorinated greenhouse gas use, of which the majority is used in refrigeration, air conditioning and heat pump equipment.

The project should improve the knowledge base of F-gas use and emission pathways under baseline conditions (i.e., policies as they are today), pathways that meet the Kigali Agreement and pathways that outperform the Kigali Agreement. The development of these pathways should also include fluorinated greenhouse gases not regulated under the Montreal Protocol, in particular those covered by the Regulation (EU) 2024/573 on fluorinated greenhouse gases<sup>46</sup>. It should cover all main regions globally separating at least the countries that fall

<sup>43</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

<sup>44</sup>

<sup>45</sup> [The Kigali Amendment \(2016\): The amendment to the Montreal Protocol agreed by the Twenty-Eighth Meeting of the Parties \(Kigali, 10-15 October 2016\) | Ozone Secretariat \(unep.org\)](#)

<sup>46</sup>

[Regulation - EU - 2024/573 - EN - EUR-Lex \(europa.eu\)](#)

under Article 5 of the Montreal Protocol and those that do not, and preferably further disaggregating them within these two classes, taking into account for instance climate conditions. The development should assess the interaction with the energy system, notably related to the deployment of HFC-alternatives in refrigeration, air conditioning and heat pump equipment and its impact on energy efficiency, the deployment of sulphur hexafluoride (SF<sub>6</sub>) or its alternatives in electrical switch-gear. Possible impacts on emissions of per- and polyfluoroalkyl substances (PFAS) should be considered. The pathways should give detailed insights into the technologies available, including the use of fluorinated greenhouse gases free alternatives.

Most fluorinated greenhouse gas emissions are related to the use in the refrigeration, air conditioning and heat pump (RACHP) equipment. This sector is projected to be one of the highest contributors to future global energy demand increases. The action should include the development of modelling tools that allow for the representation at national level of the use of F-gases and their alternatives at least in this RACHP sector, with a view to develop tools that would allow parties to the Montreal Protocol to assess at national level different options of mitigating HFC use, and the interaction with the decarbonisation of the energy system. The action should thus expand and improve the number of tools that can provide such detailed information at country level, including for the so called Article 5 Parties under the Montreal Protocol, in a manner that would improve the knowledge base for parties to implement specifically the Kigali Agreement to the Montreal Protocol as well as allow them to get insights in how to create synergies with the climate mitigation goals of the Paris Agreement, including the decarbonisation of the energy system.

All research outputs should be managed according to the FAIR principles<sup>47</sup>. Beyond open access to scientific publications and research data, open access to software, models, algorithms, workflows and protocols, cell lines, compounds, etc. is required.

All projects funded under this topic are strongly encouraged to connect, coordinate, and participate in networking, intercomparison and joint activities to exploit synergies and maximise complementarities. Activities on energy efficiency of equipment, on electricity grids or the safe use of chemicals would be of specific interest in this context. Projects should also envisage clustering activities with any other relevant projects (in and outside of Horizon Europe) for cross-projects cooperation and exchange of results. Proposals should earmark the necessary resources for these purposes.

**HORIZON-CL5-2025-03-D1-04: The attribution to climate change, and improved forecasting of extreme and slow-onset climate- and weather-related events and their impacts**

**Call: Cluster 5 Call 03-2025 (WP 2025)**

**Specific conditions**

<sup>47</sup> FAIR (Findable, Accessible, Interoperable, Reusable).

<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 6.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 12.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>48</sup>.</p> <p>Beneficiaries will be subject to the following additional obligations regarding open science practices: Open access to any new modules, models or tools developed from scratch or substantially improved with the use of EU funding under the action must be ensured through documentation, availability of model code and input data developed under the action.</p>

**Expected Outcome:** Project results are expected to contribute to all of the following expected outcomes:

- Advanced understanding of the causality between anthropogenic climate change and the frequency and intensity of climate and weather extremes (including temperature extremes, heavy precipitation and pluvial floods, river floods, droughts, storms, as well as compound events), and their risks and impacts, including cascading impacts, on human systems and ecosystems;
- Improved methodologies and tools of attribution of extreme climate- and weather-related events, and their impacts, to anthropogenic climate change;
- Enhancement of existing or creation of new pilot global databases of extreme events, impacts and their attribution;
- Advanced knowledge of how attribution science and forecasting can be operationalised for a range of policy purposes, including informing and improving civil protection and

<sup>48</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

humanitarian planning for future extreme and slow-onset events, post-disaster reconstruction, resilience and adaptation plans.

**Scope:** Anthropogenic climate change influences the intensity and likelihood of extreme weather events – the latest IPCC report warns that anthropogenic climate is already affecting weather and climate extremes across the globe and with every additional increment of global warming, changes in extremes will continue to become larger.

Attribution science tries to answer the question of what the role of anthropogenic climate change relative to other drivers (natural and non-climate anthropogenic factors), is for a given extreme climate or weather event. It is relatively nascent, and while it is fast advancing, numerous gaps remain, including on compound and cascading events, the interplay between slow and fast onset events, the appropriate statistical methods and the proper consideration of various degrees of vulnerabilities and exposure.

Some tail events, risks and associated impacts are inherently poorly represented in current simulation records. The latest advances in numerical modelling, AI and Machine Learning, counter-factual datasets using large ensembles and digital twins, for example, could increase the sample size of simulated rare – including compound and cascading – events and offer opportunities to explore the decision-making and estimated impact space (e.g., in relation to water, air pollution, ecosystem status, land use – and their combination). Propagating uncertainties along the causality chain is an important aspect to address in this context.

Actions should address **all** of the following aspects:

- Advance attribution science through a combination of observations, models, attribution methodologies applied to the physical climate conditions (fast and slow-onset event attribution for a more accurate estimation of how the likelihood and intensity of the hazards have been altered by anthropogenic climate change) and impacts (identifying how the interplay between anthropogenic climate change and local implemented responses affects residual impacts);
- Advance the understanding of the interplay between natural variability and anthropogenic climate change both in the recent past (since the instrumental data is available) and in the near- and mid- term future (2025-2060), as well as the interplay between climate and non-climate drivers of impacts;
- Advance methodologies to collect diverse in-situ and remote sensing observations to develop or contribute to robust extreme event and impact databases;
- In the context of attribution, focus on extreme and slow-onset events and their interactions (including cascading and compound events) and impacts (on human systems and ecosystems), locally implemented responses and their limits (response capacities), with due consideration of vulnerable regions;

- Deliver enhanced methods to separate the effects of climate trends (including in extreme events) from trends in exposure and vulnerability, both in observed datasets and in model scenarios;
- Investigate how different model enhancements (e.g., finer resolution, increased complexity) impact the realism and accuracy of the modelled climate and weather extremes. Strive to investigate inter-model differences and their implications for extreme event attribution and contribute to multi-model and intercomparison approaches (e.g., Inter-Sectoral Impact Model Intercomparison Project, ISIMIP), including with downscaling and bias correction of global models for better simulation of extreme events;
- Building on latest advances in attribution studies, improve forecasting of extreme climate- and weather-related events and their impacts, and contribute to the evolution of climate services;
- Improve the knowledge of how to operationalise the attribution science and forecasting for informing future planning including in some of the areas relevant for advancing disaster preparedness and prevention capacity building, humanitarian aid operations, and adaptation plans (e.g., early warning systems, disaster risk reduction including with nature-based solutions, emergency relief) via co-design and co-production with operational actors, including citizens and civil society globally and with due consideration of associated challenges in the Global South;
- The results should serve as a basis to ensure policies and actions that follow from the attribution studies can integrate climate justice.

When dealing with models, actions should promote the highest standards of transparency and openness, as much as possible going well beyond documentation and extending to aspects such as assumptions, protocols, code, and data that is managed in compliance with the FAIR principles<sup>49</sup>.

All projects funded under this topic are strongly encouraged to connect, coordinate, and participate in networking and joint activities together, as appropriate. Collaboration with Destination Earth is encouraged. Clustering activities with other relevant ongoing projects (in and out of Horizon Europe) should be envisaged for cross-projects cooperation and results from relevant past and ongoing projects, including XAIDA<sup>50</sup> and CLINT<sup>51</sup>, should be considered.

This topic requires the effective contribution of social sciences and humanities (SSH) disciplines and the involvement of SSH experts, institutions as well as the inclusion of relevant SSH expertise, in order to produce meaningful and significant effects enhancing the

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<sup>49</sup> FAIR (Findable, Accessible, Interoperable, Reusable).

<sup>50</sup> <https://cordis.europa.eu/project/id/101003469>

<sup>51</sup> <https://cordis.europa.eu/project/id/101003469>

societal impact of the related research activities. Citizen Science and other innovative and participatory forms of research could be appropriate for this action.

International cooperation is encouraged, in particular with the Global South<sup>52</sup> in the context of scientific capacity building, disaster risk reduction and strengthening of climate resilience.

**HORIZON-CL5-2025-03-D1-05: Adaptation to Climate Change: Effectiveness and Limits**

<b>Call: Cluster 5 Call 03-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 6.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 18.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Two deliverables are requested, to be jointly developed with the projects funded under this topic: A joint action plan (between months 6 and 12) and the core part of the methodology (not later than month 24).</p>

Expected Outcome: Project results are expected to contribute to all of the following expected outcomes:

- Adaptation communities - from researchers to practitioners, citizens and decision makers
  - have an improved understanding of the factors driving climate change adaptation limits<sup>53</sup> and effectiveness<sup>54</sup>;
- Policy makers can select and prioritise adaptation strategies to design adaptation policies from improved and more consistent comparability of adaptation outcomes;
- The limits and effectiveness of adaptation strategies are evaluated by a comprehensive, multidimensional set of criteria within a standardised methodology, thus contributing to

<sup>52</sup> [http://www.fc-ssc.org/en/partnership\\_program/south\\_south\\_countries](http://www.fc-ssc.org/en/partnership_program/south_south_countries)

<sup>53</sup> Adaptation limits: The point at which an actor's objectives (or system needs) cannot be secured from intolerable risks through adaptive actions. Hard adaptation limit – No adaptive actions are possible to avoid intolerable risks. Soft adaptation limit – Options may exist but are currently not available to avoid intolerable risks through adaptive action.

<sup>54</sup> Effectiveness: refers to the extent to which an action reduces vulnerability and climate-related risk, increases resilience, and avoids maladaptation (IPCC, 2022).

the work of the IPCC. A scientific contribution for updating the 1994 IPCC Technical Guidelines on impacts and adaptation is provided;

- Practitioners and decision makers at all relevant levels of governance (local, national, regional, and European) are provided with a consistent framework and tools for monitoring, evaluation, and adjustment of their adaptation strategies, both in the short term (for more effective disaster prevention and preparedness) and in the long term (for more effective transformative adaptation pathways).

**Scope:** The effectiveness of climate change adaptation measures depends, among other factors, on the magnitude and rate of warming, which can lead to context-specific hard limits being encountered. However, the scientific evidence related to adaptation effectiveness remains limited, and providing a universal definition of what constitutes effective adaptation is challenging. This is motivated by difficulties in defining baseline conditions given the dynamic nature of the adaptation, in measuring avoided impacts and in establishing causality, but also by the long lead time until responses show outcomes, and limited understanding of trade-offs across spatial scales. Ex-ante and ex-post monitoring and evaluation of adaptation at different timelines and scales is also critical but currently scarcely implemented. It is urgent to better understand and assess adaptation effectiveness and limits to increase adaptive capacity, resilience against extreme, and slow onset, non-extreme events, and to reduce vulnerability.

The actions should generate assessments of the effectiveness and limits of adaptation options based on quantitative and empirical evidence (privileging scientific literature but systematically integrating insights from grey literature), methodologically sound (replicable and with new metrics and indicators informed with uncertainty) and comprehensive in the criteria considered (such as economic, technological, legal, institutional, socio-cultural, geophysical, environmental and cross-cutting aspects that determine soft limits). Cross-cutting criteria to be included are the contribution of the adaptation solutions to mitigation, their ability to reduce cascading, compound effects and risks transmission, the degree of use of nature-based solutions (NBS), together with the feasibility, the ambition level, and their contribution to equity and justice. Other relevant aspects that should be considered are the exogenous factors, the gender, age and intersectional dimensions, the governance and the barriers and enablers.

Actions should evaluate adaptation effectiveness and limits as a function of time and for a comprehensive range of warming rates, considering the changing variability patterns. Projects should address all of the following aspects:

- Further the understanding of the general and context specific (e.g., regional, sectoral, etc.) drivers of adaptation effectiveness and limits;
- Develop a robust methodology to assess the effectiveness and limits of adaptation options in a consistent way, assuring comparability among assessments. Such a methodology should:

- o Synthesise different sources of observational (both quantitative and qualitative evidence) and modelling data that are relevant at the regional or sectoral levels to assess multiple dimensions of effectiveness and adaptation limits over time;
- o Have sufficient common core elements to ensure consistency and comparability among regions and sectors, and sufficient flexibility to reflect their contextual specificities;
- o Include a comprehensive set of measurements and indicators to characterise adaptation as a process and assess quantitatively and qualitatively the multiple dimensions and aspects of adaptation effectiveness and limits (both hard and soft);
- o Explore the optimal balance between standardisation and the context specific elements of the methodology.

- Test and apply the methodology for the following purposes:
  - o To evaluate the effectiveness of advanced and short-term planned adaptation strategies, for a variety of European (EU member states and Horizon Europe associated countries) environmental conditions and socio-economic sectors or regions (a minimum of 6 study cases is recommended). Collaboration with the EU Mission on Adaptation to Climate Change is strongly encouraged, for example, in the test cases;
  - o To inform the timeline and likelihood of emergence of context-specific (i.e., regions and sectors) limits to adaptation in a warming world, with an emphasis on societal, climate and biodiversity hotspots.
- Synthesising the results as usable knowledge for practitioners and decision makers and communicating and disseminating them using existing platforms (e.g., expanding the Climate-ADAPT platform of the European Environment Agency or other options).

While joint work will not occur at proposal stage, the common core of the methodology should be jointly developed by all the projects funded under this topic by combining their respective proposal's approaches, to ensure overall consistency. For assuring this, proposals should include a draft plan for joint actions, to be then adapted and agreed between all funded projects. Therefore, all proposals must include a deliverable preferably for month 6 (not later than month 12) that contains the agreed joint action plan. The funded projects must dedicate specific tasks and resources, setting aside an adequate budget (in the range of 15 to 25% of their total eligible budget) to collaborate with other projects funded under this topic on developing the common core of the methodology. As a result, this core part should be also a joint deliverable for not later than month 24. Then, the methodology should be separately extended by individual projects to address EU regional and sectoral contexts (e.g., by specific modules) maintaining consistency with the core part. It should build on existing data and approaches, such as those proposed by Copernicus, GAMI<sup>55</sup>, EUCRA<sup>56</sup>, WASP<sup>57</sup> and other

<sup>55</sup> <https://globaladaptation.github.io/>

relevant sources. Aspects such as sectorial and geographical coverage of the real-world case studies are left to the proposals to decide, provided they demonstrate a wide variety of existing or new adaptation options in Europe.

Actions should promote the highest standards of transparency and openness and be managed in compliance with the FAIR principles<sup>58</sup>.

This topic requires the effective contribution of social sciences and humanities (SSH) disciplines and the involvement of SSH experts, institutions as well as the inclusion of relevant SSH expertise, in order to produce meaningful and significant effects enhancing the societal impact of the related research activities.

In addition, the projects funded under this call should envisage clustering activities with other relevant ongoing projects, in and outside of Horizon Europe, for cross-projects cooperation and exchange of results, and build on projects funded under previous calls of this Destination related to adaptation. Projects funded are also strongly encouraged to participate in the Mission Community of Practice of the Mission Climate Adaptation<sup>59</sup>.

**HORIZON-CL5-2025-03-D1-06: Fostering equity and justice in climate policies – Societal Readiness Pilot**

<b>Call: Cluster 5 Call 03-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of between EUR 4.00 and 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 15.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Admissibility conditions</i>	The conditions are described in General Annex A. The following exceptions apply:  The page limit is extended by two pages to 47.
<i>Eligibility</i>	The conditions are described in General Annex B. The following

<sup>56</sup> <https://www.eea.europa.eu/publications/european-climate-risk-assessment>

<sup>57</sup> For example, Least Developed Countries Fund (LDCF), Special Climate Change Fund (SCCF), Global Climate Facility (GCF), Adaptation Fund (AF).

<sup>58</sup> FAIR (Findable, Accessible, Interoperable, Reusable).

<sup>59</sup> <https://climate-adapt.eea.europa.eu/en/mission/community-of-practice>

<i>conditions</i>	<p>exceptions apply:</p> <p>The consortium must include at least three partners from different Global South countries<sup>60</sup>.</p>
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). <sup>61</sup>.</p>

**Expected Outcome:** Project results are expected to contribute to all of the following expected outcomes:

- Climate policies are made more inclusive and equitable, facilitating acceptance across political and societal stakeholders with various socio-economic and development status, both within the EU and globally, enabling high ambition climate action and helping to deliver on the European Green Deal’s commitment to “leave no one behind”;
- There is an improved consensus between the Global North and the Global South within the UNFCCC process, unlocking a greater momentum in the implementation of the Paris Agreement;
- The evidence base underpinning IPCC assessments is strengthened, diversified, and made more inclusive, facilitating consensus and smoother government approval processes;

Social science perspectives on justice and equity are better incorporated into policy narratives, scenarios, and models, improving their societal relevance and ensuring that climate action strategies are more reflective of the needs, values and concerns of diverse societal groups, building trust in results and outcomes, and increasing their uptake potential.

**Scope:** Climate change and the transition to low-carbon, climate-resilient future raises complex justice questions around equitable sharing of benefits and burdens of mitigation and adaptation efforts. There is growing evidence on how the most vulnerable populations, who have contributed the least to climate change, are disproportionately at risk, thereby exacerbating inequalities between and within countries. These considerations not only animate global climate negotiations, but also increasingly emerge as a central issue for national politics, legal systems and for the society at large. Fairness thus becomes both a

<sup>60</sup> [http://www.fc-ssc.org/en/partnership\\_program/south\\_south\\_countries](http://www.fc-ssc.org/en/partnership_program/south_south_countries)

<sup>61</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

critical enabler and a potential barrier for shaping ambitious climate action, underscoring the need for prioritising research on advancing just climate transitions within the EU and globally.

For example, mitigation scenarios that have informed and influenced global climate policymaking and target-setting, and form a vital component of IPCC assessments, have been criticised for not considering fairness more explicitly and systematically, and with regard to transparency. These shortcomings create a barrier to their acceptance as a basis for global mitigation efforts, in particular among policymakers from developing countries. On the other hand, to avoid exacerbating existing vulnerabilities and locking into maladaptive pathways, it is also necessary to better account for the justice dimension in adaptation planning and implementation, for example, by paying more attention to factors that can influence how fair adaptation processes and outcomes are.

Actions should advance more comprehensive and interdisciplinary understanding of climate justice in the context of the European and global mitigation and adaptation policies, promoting awareness and consistency in examining related concerns. They should take into consideration socio-economic, territorial and development disparities that exist between and within countries, regions and across various segments of the population. Actions should address multiple dimensions of justice, diverse spatial and temporal scales (e.g., intergenerational justice), and explore the role of a broad range of social, political, economic, and cultural contexts and factors. These include both collective (such as values, power structures, institutional and legal frameworks, political economy, development models, climate elites) and individual (such as age, gender, and intersectionality) features. Building on the resulting insights, actions are expected to develop recommendations on how to design, implement and evaluate just climate transitions, including definition of specific indicators, standards, and criteria to better operationalise the justice concept in adaptation and mitigation pathways. Among others, actions should address one or more of the following aspects<sup>62</sup>:

1. Improve integrated assessment models to better represent justice and equity, differences in regional outcomes, and common but differentiated responsibilities and respective capabilities. Extend the range of socio-economic assumptions to underpin global mitigation scenarios, with particular attention to equity;
2. Enhance clarity, comparability, and transparency across global mitigation scenarios with regard to different justice aspects. Evaluate the feasibility and consistency of regionally differentiated long-term mitigation goals in terms of, for example, investments and financial flows, governance and institutional needs;
3. Analyse distributional aspects of climate policies, assess consequences for well-being and living standards of people from different socio-economic and development contexts. Advance research to detect effects on and assess the needs of the most vulnerable and disadvantaged population segments (e.g., elderly, children, women, migrants, minorities,

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<sup>62</sup> The evaluation will be based on the standard Horizon Europe evaluation criteria, regardless of the number of the aspects covered

households at risk from energy and/or transport poverty) and sectors, and provide recommendations for corrective measures;

4. Assess the trade-offs and co-benefits between climate action and inequality reduction. Explore the role of inequality and injustice as constraints to individual and collective climate action;
5. Investigate innovative climate policy instruments, initiatives and approaches alternative to those prioritising economic efficiency and propose a broader spectrum of climate policies, beyond, for example, globally uniform carbon pricing. Assess the feasibility of these proposals;
6. Investigate justice in the context of sectorial transitions, with focus on under-researched (from equity perspective) sectors such as agriculture, forestry and land use;
7. Advance research on how to better account for the needs and constraints of the poor and vulnerable communities in disaster risk reduction and adaptation strategies.

Actions should address justice and equity of climate policies both within the EU and from a global perspective, but they may choose to prioritise one of these dimensions, using the other as framing information.

The research should be conducted through close collaboration between European and Global South research teams, hence international cooperation is required (see eligibility conditions). Moreover, involvement of key stakeholders and regional experts as part of an inclusive process is essential to guarantee that all relevant perspectives are adequately represented. The support and involvement of citizens and civil society is also central to achieving the targeted outcomes.

All projects funded under this topic are strongly encouraged to connect, coordinate, and participate in networking, intercomparison and joint activities, to exploit synergies and maximise complementarities. They should also envisage clustering activities with any other relevant projects (in<sup>63</sup> and outside of Horizon Europe) for cross-projects cooperation and exchange of results. Proposals should earmark the necessary resources for these purposes.

**This topic is a Societal-Readiness pilot:**

- Proposals must follow the specific requirements applying to the Societal readiness pilot, as described in the introduction of the Horizon Europe Main Work Programme 2025 for Climate, Energy and Mobility. They entail the use of an interdisciplinary approach to deepening consideration and responsiveness of research and innovation activities to societal needs and concerns.

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<sup>63</sup> For example, relevant projects funded under the calls of Horizon Europe Cluster 5 on Climate sciences and responses and Cluster 2 on Innovative research on social and economic transformations in Cluster 24.

- This topic requires effective contribution of the relevant SSH expertise, including the involvement of SSH experts in the consortium, to meaningfully support Societal Readiness. Specifically, SSH expertise is expected to facilitate the socio-technological interface and enable the design of project objectives with Societal Readiness related activities. Consortia should mobilise a variety of SSH research backgrounds, in particular equity, poverty, and gender experts.

**HORIZON-CL5-2025-03-D1-07: Implementing the climate action pillar of the EU-African Union Partnership on Climate Change and Sustainable Energy**

<b>Call: Cluster 5 Call 03-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of between EUR 3.00 and 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 4.00 million.
<i>Type of Action</i>	Coordination and Support Actions
<i>Eligibility conditions</i>	<p>The conditions are described in General Annex B. The following exceptions apply:</p> <p>If eligible for funding, legal entities established in the African Union member states may exceptionally participate in this Coordination and Support Action as beneficiary or affiliated entity.</p> <p>Due to the specific nature of this topic, in addition to the minimum number of participants set out in the General Annexes, at least 40% of the beneficiaries must be legal entities established in the African Union member states.</p> <p>International organisations with headquarters in a European Union Member State, Horizon Europe associated country or an African Union member state are also exceptionally eligible for funding. The international organisations established in an African Union member state should not be considered as African Union legal entities for the purpose of the action (and hence should not count towards the 40% objective).</p>

**Expected Outcome:** The action is intended to set the foundation for future collaborative activities between the African Union (AU) and the European Union (EU) on climate change research in the context of the implementation of the Partnership on Climate Change and

Sustainable Energy (CCSE)<sup>64</sup> under the AU-EU High Level Policy Dialogue (HLPD) on Science, Technology, and Innovation<sup>65</sup> and its Innovation Agenda<sup>66</sup>.

Project results are expected to contribute to all of the following expected outcomes:

- Stakeholders, including funding entities, contribute more effectively to the implementation of the climate action pillar of the AU-EU CCSE Research and Innovation Partnership through an agreed strategy and reinforced R&I coordination;
- The R&I agendas and initiatives on climate issues relevant for Africa are better aligned and defragmented between the EU, national and multilateral levels. Impact of funding is enhanced;
- The climate-related data gap on Africa is reduced and AU countries are better able to access, utilise, and deploy state-of-art climate knowledge and services to inform decision-making and to accelerate a science-based implementation of the Paris Agreement, the Agenda 2030 on Sustainable Development as well as the AU Climate Change and Resilient Development Strategy and Action Plan (2022-2032);
- Impacts and risks of climate change are more accurately assessed, adaptation strategies are developed, and early warning systems are deployed. This strengthens climate and disaster resilience in the AU member states, contributing to the international dimension of the EU Adaptation Strategy, the EU Disaster Resilience Goals, the Sendai Framework for Disaster Risk Reduction, the Nairobi Declaration and the Early Warnings for All initiative;

A stronger climate research community in the AU, with researchers and scientific institutes enabled to engage more effectively in internationally funded research and better included in multilateral collaboration networks, with positive effects on diversity and quality of climate science research and benefiting key international assessments (e.g., IPCC).

**Scope:** African societies and productive sectors are already experiencing widespread impacts from natural hazards and human induced climate change, including loss of lives and biodiversity, increased disease burden, water shortages, ocean acidification, reduced food production, labour effectiveness and economic growth. The IPCC warns that with additional warming these risks will further escalate. Socioeconomic, political, and other environmental factors such as high demographic pressure, violent conflicts, unsustainable ocean and land-use patterns, strong reliance on agriculture and natural resources, interact with climate change and further exacerbate the region's vulnerability, undermining its socio-economic advancements. Yet, the continent is very poorly equipped to deal with climate related challenges and natural

<sup>64</sup> [https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/europe-world/international-cooperation/regional-dialogues-and-international-organisations/eu-africa-cooperation/partnership-climate-change-and-sustainable-energy-ccse\\_en](https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/europe-world/international-cooperation/regional-dialogues-and-international-organisations/eu-africa-cooperation/partnership-climate-change-and-sustainable-energy-ccse_en)

<sup>65</sup> [https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/europe-world/international-cooperation/regional-dialogues-and-international-organisations/eu-africa-cooperation\\_en](https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/europe-world/international-cooperation/regional-dialogues-and-international-organisations/eu-africa-cooperation_en)

<sup>66</sup> [https://research-and-innovation.ec.europa.eu/system/files/2023-07/ec\\_rtd\\_au-eu-innovation-agenda-final-version.pdf](https://research-and-innovation.ec.europa.eu/system/files/2023-07/ec_rtd_au-eu-innovation-agenda-final-version.pdf)

disaster risks: for example, only 40% of its population has access to early warning systems – the lowest rate of any region of the world, and many countries lack quality climate data.

In addition, despite multiple efforts to promote climate research and capacity development, African scientists, scholars, and practitioners are still significantly underrepresented in international fora, such as the IPCC. Furthermore, the bulk of research concerning the region is performed by groups from the Global North, not sufficiently incorporating indigenous knowledge, local contexts and needs. It is now vital that the assessments of climate change related impacts and risks, response strategies and Early Warning Systems are delivered in large part by the African community, not simply created ex-Africa.

The partnership on Climate Change and Sustainable Energy (CCSE) between the EU and the AU, along with the shared priority of combating climate change in both regions, call for a strengthened and more coordinated R&I cooperation on climate change research, with a longer-term outlook. Given the accelerating impacts in Africa, there is a strong case for prioritising climate risk reduction and adaptation.

This action is intended as a preparatory step towards future joint collaborative activities between the EU, and the AU and their respective Member States to support the implementation of the “Climate Action for adaptation and mitigation” Pillar of the CCSE partnership. This pillar encompasses 1) climate-related data, 2) climate services, 3) and an integrated knowledge approach to support AU countries in their efforts to implement the Paris Agreement and should be used to frame the activities of the project. The action should therefore establish a joint strategy for improving the availability and accelerating the uptake of advanced climate knowledge, data, and products across Africa, including through Earth Observation. The aim is to enhance climate literacy, to develop and increase uptake of climate services and early-warning systems, and to support capacity building while taking into consideration the continent’s socio-economic circumstances and user needs. Therefore, it is expected to address all of the following aspects:

- Develop a joint roadmap identifying priorities, flagship actions and feasible implementation architecture (including most appropriate financing instruments, not limited to EU level) to pave the way towards more targeted EU-AU cooperation on climate change research, with particular focus on climate risk reduction and resilience building (to be delivered within the first year of the project);
- Mobilise and secure commitments from European and African national funding entities and other actors (e.g., philanthropies, international cooperation entities and financial institutions) necessary to implement joint EU-AU collaborative activities, including a potential Horizon Europe co-fund action in 2026-2027 work programme (to be delivered within the first year of the project);
- Map the relevant EU funded projects (such as CONFER, FOCUS-Africa, DOWN2EARTH, ALBATROSS, SAFE4ALL, HABITABLE, TEMBO-Africa,

SINCERE<sup>67</sup>), match their outputs with the objectives of the CCSE Partnership, and cluster them to establish a vibrant community. Develop and implement a strategy to consolidate, curate, valorise and disseminate the projects' outputs towards African stakeholders to amplify their impact. This should include a user-friendly platform for sharing best practises and lessons learnt from past and ongoing EU-funded projects, also considering links to internationally and nationally funded activities, to provide greater visibility and enable scaling and replication of successful initiatives. In addition, the action should investigate how to best identify, valorise, and disseminate knowledge and solutions from the EU Mission on Adaptation Climate Change of relevance to the African context;

- Design and start implementing training and capacity building strategy that should enable: i) effective climate action planning and management, ii) enhanced representation and diversity of African science and scientists in international fora, iii) advance generation of data, products, applications, services, and policy relevant knowledge on climate change, and iv) a greater participation of women, youth and marginalised communities.

The action should bring together core European and African funding agencies, research organisations and other key African organisations and networks such as regional and national climate service centres. Strong representation of African partners in the consortium is a core requirement (see eligibility conditions). In addition, the action should strive at better connecting scientists, policy makers, practitioners, and citizens for integrated solutions, at mobilising private sector engagement and at promoting the uptake of indigenous knowledge and Citizen Science. Efforts should be made to ensure that the data produced in the context of this topic is managed according to the FAIR principles<sup>68</sup>.

The action should build on and aim at improving the coordination between existing and forthcoming multilateral and bilateral initiatives, such as the Climate Services for Risk Reduction in Africa (CS4RRA)<sup>69</sup>, the ClimSA<sup>70</sup> programme, as well as projects funded by the EU (Horizon 2020 and Horizon Europe) and the JPI-Climate (ERA4CS). Synergies should also be sought, where possible, with other relevant activities of the World Climate Research Programme, the World Adaptation Science Programme, the World Meteorological Organisation, the Group on Earth Observations, or the Copernicus programme. It is advisable that the action integrates the lessons learnt from the implementation of the energy pillar of the CCSE Partnership<sup>71</sup>.

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<sup>67</sup> Please refer to <https://cordis.europa.eu/projects/en> for more information

<sup>68</sup> FAIR (Findable, Accessible, Interoperable, Reusable).

<sup>69</sup> <http://cs4rra.wascal.org/>

<sup>70</sup> <https://www.climsa.org/>

<sup>71</sup> See <https://cordis.europa.eu/project/id/815264> and <https://cordis.europa.eu/project/id/963530>

## Cross-sectoral solutions for the climate transition

This Destination contributes directly to the Strategic Plan's **Key Strategic Orientations** '*Green transition*', '*Digital transition*' and '*A more resilient, competitive, inclusive and democratic Europe*'.

In line with the Strategic Plan, the overall **expected impact** of this Destination is to contribute to the "*Facilitating a clean and sustainable transition of the energy and transport sectors towards climate neutrality through cross-cutting solutions*".

This Destination covers thematic areas which are cross-cutting by nature and can provide key solutions for climate, energy and mobility applications. In line with the scope of cluster 5 such areas are batteries, hydrogen<sup>72</sup>, communities and cities<sup>73</sup> and others. Although these areas are very distinct in terms of challenges, stakeholder communities and expected impacts, they have their cross-cutting nature as a unifying feature and are therefore grouped, if not addressed in other places of this work programme, under this Destination.

**The main impacts to be generated by topics under this Destination are:**

### Batteries

- Increased competitiveness and strategic autonomy of EU Battery sector while maximising sustainability.
- Enhanced local and circular supply chains by reducing dependency on critical raw materials and upscaling processing capacity, also for recycled materials.
- An integrated European battery sector for high performance batteries, from design to manufacturing and all the way to end of life, reducing environmental impact.
- Improved resilience of EU energy system and facilitated integration of renewable energy sources through application of energy storage.
- Affordable and reliable batteries to boost the market penetration of Electric Vehicles and storage systems.

### Cities and Communities

This topic is for continuation of the **Driving Urban Transition (DUT) co-funded partnership** to assist cities in their sustainability and climate neutrality transitions. The main impacts expected are:

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<sup>72</sup> The bulk of activities are supported by the Institutional Partnership 'Clean Hydrogen'.

<sup>73</sup> Communities and cities are mainly supported under the Mission on Climate-Neutral and Smart Cities, and through the co-funded Partnership 'Driving Urban Transition', implemented in this work programme as a grant to identified beneficiary.

- Strengthen EU as a role model for R&I and cooperation with international cities to align strategies and support the role of DUT as co-lead of the Urban Transitions Mission (UTM) under Mission Innovation (MI);
- Innovative urban governance, policy, and decision-making engaging citizens in the city making process;
- Integration of mobility and transport services, and their alignment with citizens' needs;
- Climate-neutral, safe, inclusive and liveable neighbourhoods, towns, cities and urban services for the citizens' well-being;
- Empowerment of all actors such as local authorities, business, civil society, knowledge institutions and citizens, being engaged in climate-neutrality transitions;
- Evidence-based implementation of the European Green Deal, the Urban Agenda for the EU and other urban-relevant policies and strategies.

## **Batteries**

Proposals are invited against the following topic(s):

**HORIZON-CL5-2026-01-D2-01: Development of sustainable and design-to-cost batteries with (energy-)efficient manufacturing processes and based on advanced and safer materials (Batt4EU Partnership)**

<b>Call: Cluster 5 Call 01-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 8.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 24.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Eligibility conditions</i>	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL6 (for manganese-rich HLM) and TRL7 (for lithium manganese iron phosphate and sodium-ion) by the end of the project – see General Annex B. Activities may start at any TRL.

**Expected Outcome:** Project results are expected to contribute to all of the following outcomes:

- Development of next generation low-cost batteries for improving the affordability of electric mobility, enhancing the competitiveness of the European battery value chain, while lowering the share of Critical Raw Materials (CRM)<sup>74</sup>;
- Improved adaptation and flexibility of advanced and sustainable production processes in European battery manufacturing;
- Improved adaptation/flexibility of design-to-circularity strategies.

**Scope:** Proposals are expected to target technologies for design-to-cost batteries, with little reliance on CRMs, from one of the following two main technologies:

- Liquid electrolyte lithium-ion batteries with lithium manganese iron phosphate (LMFP) or manganese-rich HLM (high lithium, manganese) as cathode materials (design-to-cost lithium-ion batteries for mobility<sup>75</sup>);
- Sodium-ion batteries for mobility applications.

The projects are expected to demonstrate, at the end of the project, the following:

For HLM and LMFP chemistries, at the cell level:

- Gravimetric energy density and volumetric energy density of at least 220 Wh/kg (for LMFP) and 250 Wh/kg (for HLM) and 550 Wh/L (for both) at operational temperature, respectively;
- Charging duration of 20 minutes (20-80% SoC);
- Cycle life of >4000 cycles for LMFP and >1500 cycles for HLM at 80% depth of discharge;
- Electric Vehicle (EV) grade cell format and capacity;
- A feasible pathway towards a competitive cost of 50-75€/kWh at pack level by 2030.

For sodium-ion batteries at cell level:

- Gravimetric energy density and volumetric energy density of 180-200 Wh/kg and 400+ Wh/L at operational temperature, respectively;
- Cycle life of 4000-6000 cycles at 80% depth of discharge;
- Charging duration of 20 minutes (20-80% SoC);
- EV grade cell format and capacity;

<sup>74</sup>

[Regulation - EU - 2024/1252 - EN - EUR-Lex \(europa.eu\)](https://eur-lex.europa.eu/eli/reg/2024/1252)

<sup>75</sup>

<https://bepassociation.eu/our-work/sria/>

- A credible pathway towards a competitive cost level of 50-75€/kWh at pack level by 2030.

Projects are expected to demonstrate the production of cell prototypes at pilot level and feasibility of compatibility (or improvement) of the developed materials with regards to at least one of the following cell production processes:

- Dry or aqueous processing technologies;
- Advanced electrode drying processes;
- Improved cell formation processes and aging protocols;
- Improved energy efficiency of processes in dry rooms.

Proposals are expected to provide the corresponding state-of-the-art benchmark for the selected production process and compare the project's compatibility or improvement targets to said benchmark.

Furthermore, projects are expected to demonstrate the feasibility of compatibility (or improvement) of the developed materials with regards to at least one of the following:

- Design for sorting, dismantling, separation, cost-effective repairing/regeneration, and safe recycling (including direct recycling);
- Adapting Sensing solutions to improve lifetime and state of health detection;
- Quantification of degradation mechanisms at early stage to determine the best strategy for beyond the first life.

Plans for the exploitation and dissemination of results for proposals submitted under this topic must include a strong business case and sound exploitation strategy, as outlined in the introduction to this Destination. The exploitation plans are expected to include preliminary plans for scalability, commercialisation, and deployment (feasibility study, business plan) indicating the possible funding sources to be potentially used (in particular the Innovation Fund).

Proposals could consider the involvement of the European Commission's Joint Research Centre (JRC) whose contribution could consist of providing added value regarding integral evaluation of safety of materials. For further information on the JRC's possible contribution to the projects, please, search for additional publicly available information on the JRC's website (EU Science Hub) on the NCP portal, or request specific information from the JRC (JRC-NCP-Network@ec.europa.eu)

JRC shall assure that all the other applicants receive the same information on the JRC's possible contribution to the project (e.g., via the topic-specific FAQs under the Funding and Tenders Portal).

Projects are expected to collaborate and contribute to the activities of the Coordination and Support Action defined under the topic HORIZON-CL5-2025-D2-02-06.

To strengthen the European battery ecosystem, projects are expected to use materials, products and equipment produced in EU Member States and countries associated to Horizon Europe, unless it is demonstrated that no valid option exists.

This topic implements the co-programmed European Partnership on Batteries (Batt4EU). As such, projects resulting from this topic will be expected to report on the results to the European Partnership on Batteries (Batt4EU) in support of the monitoring of its KPIs.

**HORIZON-CL5-2025-02-D2-02: Cost-effective next-generation batteries for long-duration stationary storage (Batt4EU Partnership)**

<b>Call: Cluster 5 Call 02-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 15.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Eligibility conditions</i>	<p>The conditions are described in General Annex B. The following exceptions apply:</p> <p>The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.</p>
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 4-5 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>76</sup>.</p>

<sup>76</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

**Expected Outcome:** Project results are expected to contribute to all of the following outcomes:

- Advanced battery materials aiming at storage duration from 10 hours to seasonal storage are developed, thus contributing to the Renewable Energy targets set by RePowerEU;
- Minimised use of Critical Raw Materials (CRM) in line with the EU's Critical Raw Materials Act <sup>77</sup> to enhance economic base, reduce dependencies and ensure competitiveness in green and digital transitions;
- Development of viable alternatives to the current state of the art for battery technologies and to other seasonal storage devices in terms of cost, efficiency, safety, lifetime and (environmental) sustainability;
- Improved longevity of energy storage systems;
- Battery technologies with minimal required auxiliary services, storage in a wide range of State-of-Charges (SOCs), and minimal voltage slippage.

**Scope:** This topic aims to promote the development of materials that are recyclable, with low environmental impact, safe and with a potential for large-scale manufacturing. To the extent possible, the safety and sustainability of developed materials are expected to be assessed in alignment with the Commission Recommendation on safe and sustainable by design chemicals and materials<sup>78</sup>.

Projects are expected to demonstrate credible commercial and technical path that are able to satisfy all the following points:

- Energy storage system cost lower than 50 €/kWh;
- Projected lifetime of 20 years with minimised self-discharge in operating and ambient conditions typical of the selected application;
- Minimum round-trip efficiency of 50% at energy storage system (AC) level and 75% at cell level;
- Large-scale deployment in the long term of reliable materials supply and manufacturing of cell or reaction stack.

Projects are expected to focus on technologies that are presently at a low Technology Readiness Level. Lithium-ion, vanadium-based redox flow, sodium-ion, molten sodium-sulphur and other commercialised technologies are out of scope of this topic.

<sup>77</sup> [Regulation - EU - 2024/1252 - EN - EUR-Lex \(europa.eu\)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32024R1252)

<sup>78</sup> [https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/recommendation-safe-and-sustainable-chemicals-published-2022-12-08\\_en](https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/recommendation-safe-and-sustainable-chemicals-published-2022-12-08_en)

Taking the above into account, the scope of the topic is technology neutral. In case the following battery chemistries or configurations are chosen, the following points must be addressed:

- For metal-air chemistries: reduce sensitivity to impurities of gases;
- For multivalent chemistries: develop electrolytes with reduced corrosivity and improved compatibility with other cell components and housing;
- For materials for redox flow chemistries: develop redox couples with minimised share of Critical Raw Materials (CRM)<sup>79</sup>;
- For Potassium batteries: address rate performance limitations due to potassium ion diffusivity and electrolyte decomposition due to high K+/K redox.

Projects are encouraged to implement calibrated and validated computational models and/or (generative) artificial intelligence methods for materials discovery and cell design.

Plans for the exploitation and dissemination of results for proposals submitted under this topic must include a strong business case and sound exploitation strategy, as outlined in the introduction to this Destination. The exploitation plans should include preliminary plans for scalability, commercialisation, and deployment (feasibility study, business plan).

Proposals could consider the involvement of the European Commission's Joint Research Centre (JRC) whose contribution could consist of performing experimental research on battery performance and/or safety. For further information on the JRC's possible contribution to the projects, please, search for additional publicly available information on the JRC's website (EU Science Hub) on the NCP portal, or request specific information from the JRC (JRC-NCP-Network@ec.europa.eu)

JRC shall assure that all the other applicants receive the same information on the JRC's possible contribution to the project (e.g., via the topic-specific FAQs under the Funding and Tenders Portal).

Projects are expected to collaborate and contribute to the activities of the Coordination and Support Action defined under the topic HORIZON-CL5-2025-D2-02-06.

To strengthen the European battery ecosystem, projects are expected to use materials, products and equipment produced in EU Member States and countries associated to Horizon Europe, unless it is demonstrated that no valid option exists.

This topic implements the co-programmed European Partnership on Batteries (Batt4EU). As such, projects resulting from this topic will be expected to report on the results to the European Partnership on Batteries (Batt4EU) in support of the monitoring of its KPIs.

<sup>79</sup>

[Regulation - EU - 2024/1252 - EN - EUR-Lex \(europa.eu\)](https://eur-lex.europa.eu/eli/reg/2024/1252)

**HORIZON-CL5-2025-02-D2-03: Sustainable processing and refining of raw materials to produce battery grade Li-ion battery materials (Batt4EU Partnership)**

<b>Call: Cluster 5 Call 02-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 10.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 20.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Eligibility conditions</i>	<p>The conditions are described in General Annex B. The following exceptions apply:</p> <p>The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.</p> <p>To increase EU resilience in raw materials supply chains and thus reduce the serious risk to the Union's strategic assets, economic and societal interests, autonomy and security associated with the current EU reliance on a few third countries for critical raw materials, by increasing sustainable and responsible sourcing of primary and secondary raw materials necessary to enable the green and digital transition and in alignment with the Communication (2020) 474 on Critical Raw Materials Resilience and the Critical Raw Materials Act, participation in this topic is limited to legal entities established in Member States, associated countries, OECD countries, African Union Member States*, MERCOSUR, CARIFORUM, Andean Community and countries with which the EU has concluded strategic partnerships on raw materials<sup>80</sup>. The choice of these countries was made taking into consideration the development of strategic international partnerships on raw materials and avoidance of reinforcing existing over-dependencies, as well as the importance of involving partners committed to pursuing open trade in such materials. Proposals including legal entities which are not established in the countries that fall under the criteria above will be ineligible.</p> <p>*"African Union Member States" includes countries whose membership has been temporarily suspended.</p>
<i>Technology</i>	Activities are expected to achieve TRL 6-7 by the end of the project –

<sup>80</sup>

[Raw materials diplomacy - European Commission \(europa.eu\)](#)

<i>Readiness Level</i>	see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>81</sup>.</p>

**Expected Outcome:** Project results are expected to contribute to all of the following outcomes:

- Strategic autonomy for the EU in the battery raw materials sector, with a focus on creating new business models and opportunities within a strengthened battery value chain;
- Increased processing and refining capacities of battery raw materials, contributing to the target of 40% of domestic processing capacity in the EU for Strategic Raw Materials<sup>82</sup>;
- Advanced technologies for the processing of primary and secondary raw materials into high-quality battery metals or active materials are demonstrated, emphasising operational feasibility;
- Sustainability, efficiency, and resilience of the European Li-ion battery sector is significantly increased by adopting innovative refining and processing solutions;
- Circular battery value chains within EU are promoted by expanding the European refining capacity for secondary streams and implementing the objectives of the Batteries Regulation<sup>83</sup>;
- Improved societal acceptance of processing plants.

**Scope:** Projects are expected to demonstrate the cost-efficient and sustainable production of at least one of the following final products:

- Battery-grade metals and precursors;
- Electrode active materials.

Raw materials in the scope are limited to lithium, cobalt, graphite, nickel, manganese and phosphorus.

<sup>81</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

<sup>82</sup> <https://rmis.jrc.ec.europa.eu/eu-critical-raw-materials>

<sup>83</sup> [https://environment.ec.europa.eu/topics/waste-and-recycling/batteries\\_en](https://environment.ec.europa.eu/topics/waste-and-recycling/batteries_en)

The proposed processes need to be ready for large-scale adoption, using at least one of the following source materials:

- Primary: Refining of raw materials from ores, brine, or other bearing minerals, with processes tailored to resources coming from the EU (or countries associated to Horizon Europe);
- Secondary, such as mining waste, tailings, sludges and slags (for Ni, Co), intermediate products of end-of-life processes (e.g., black mass), manufacturing scraps, and wastewater from processing.

Mining and mechanical recycling processes of battery cells, modules and packs are out of scope for this topic. The use of waste batteries and battery manufacturing waste which require mechanical (pre-)treatment is also out of scope.

Integration of produced electrode materials into cell production is out of scope, but validation of functionality and quality of the processed materials is within the scope.

Plans for the exploitation and dissemination of results for proposals submitted under this topic must include a strong business case and sound exploitation strategy, as outlined in the introduction to this Destination. The exploitation plans are expected to include preliminary plans for scalability, commercialisation, and deployment (feasibility study, business plan) indicating the possible funding sources to be potentially used (in particular the Innovation Fund).

Proposals are expected to evaluate the social acceptance of the proposed sustainable business models, by consulting and involving actors directly affected by the planned processing activities. Proposals should demonstrate the potential of the proposed solutions to reduce environmental and social barriers to the deployment of new production facilities.

Proposals could consider the involvement of the European Commission's Joint Research Centre (JRC) whose contribution could consist of providing added value regarding various aspects of battery sustainability, considering in particular provisions of the 2023/1542 battery regulation. For further information on the JRC's possible contribution to the projects, please, search for additional publicly available information on the JRC's website (EU Science Hub) on the NCP portal, or request specific information from the JRC (JRC-NCP-Network@ec.europa.eu)

JRC shall assure that all the other applicants receive the same information on the JRC's possible contribution to the project (e.g., via the topic-specific FAQs under the Funding and Tenders Portal).

Projects are expected to collaborate and contribute to the activities of the Coordination and Support Action defined under the topic HORIZON-CL5-2025-D2-02-06.

This topic implements the co-programmed European Partnership on Batteries (Batt4EU). As such, projects resulting from this topic will be expected to report on the results to the European Partnership on Batteries (Batt4EU) in support of the monitoring of its KPIs.

**HORIZON-CL5-2026-01-D2-04: Integrating advanced material, cell design and manufacturing development for high-performance batteries aimed at mobility (Batt4EU Partnership)**

<b>Call: Cluster 5 Call 01-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 10.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 30.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Eligibility conditions</i>	<p>The conditions are described in General Annex B. The following exceptions apply:</p> <p>The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.</p>
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 5 by the end of the project – see General Annex B. Activities may start at any TRL.

Expected Outcome: Project results under this topic are expected to contribute to all of the following outcomes:

- European battery cell manufacturers are supported in their transition from incumbent (Gen.3) liquid electrolyte lithium-ion battery to high performance (solid-state) lithium-ion batteries;
- Increased diversity of chemistries, cell design (application-oriented) of the existing production lines and enabling European Original Equipment Manufacturers (OEMs) to stay competitive;
- Scaled production for premium products is targeted in the medium-term (for specific applications such as aviation), and large-scale production is targeted in the longer term.

Scope: The scope covers solid-state lithium-ion battery technologies (including semi-solid technologies, but with a preference for full solid-state) which encompasses Si-C composite anodes **or** lithium metal anodes.

**Process-Specific Machinery and Technological Upgrades**

Projects are expected to identify and target at least one key manufacturing process for enhancement, and to focus on optimising and testing the specific critical process(es) within existing production lines rather than overhauling the entire production system. These processes must be critical to the transition from liquid electrolyte to solid-state batteries and have the potential for high-impact improvements in terms of production yield, quality, cost, and sustainability including energy consumption.

Projects are expected to cover all of the following tasks:

- Provide detailed plans on how existing machinery and systems can be adapted to optimise the chosen process, ensuring that these enhancements are both impactful and economically viable;
- Modify existing machinery to better support the specialised requirements of the targeted process. This includes enhancing capabilities to handle new materials and designs efficiently;
- Develop and implement technological innovations that specifically enhance the chosen process, such as precision manufacturing tools and additive manufacturing.

### **Feasibility and Impact Validation**

Projects are expected to conduct pilot testing to validate the feasibility and benefits of the enhancements on the chosen process. Proposals are expected to include clear metrics for evaluating improvements, such as reductions in energy consumption, increases in production yield, and enhancements in product consistency.

Projects are encouraged to evaluate the impact of the new or improved process on other steps in the manufacturing line, including any necessary modifications to adjacent processes, or across other parts of the production line and in different manufacturing environments.

### **Advanced Materials and Cell Design Integration**

Projects are expected to tailor the design of the produced cell to maximise the benefits of the improved process. This can be done through the development of new advanced materials or through the integration of existing materials to improve the targeted manufacturing process.

### **Digitalisation, Data Integration and Analytics and Process Control**

Projects are expected to cover at least one of the following tasks:

- Implement advanced control systems and digital technologies that are specifically designed to optimise the chosen process, improving efficiency, and reducing waste;
- Develop new process simulation methods, process models and materials chemistry models allowing to virtually assess novel cell designs' flexible manufacturability at scale for adapted existing plants.

In addition, projects are encouraged to leverage data analytics and data-driven approaches (artificial intelligence) to enhance decision-making and process optimisation, focusing on the specific needs and challenges of the targeted process.

Plans for the exploitation and dissemination of results for proposals submitted under this topic must include a strong business case and sound exploitation strategy, as outlined in the introduction to this Destination. The exploitation plans are expected to include preliminary plans for scalability, commercialisation, and deployment (feasibility study, business plan).

Proposals could consider the involvement of the European Commission's Joint Research Centre (JRC) whose contribution could consist of performing experimental research on battery performance and/or safety. For further information on the JRC's possible contribution to the projects, please, search for additional publicly available information on the JRC's website (EU Science Hub) on the NCP portal or request specific information from the JRC (JRC-NCP-Network@ec.europa.eu).

JRC shall assure that all the other applicants receive the same information on the JRC's possible contribution to the project (e.g., via the topic-specific FAQs under the Funding and Tenders Portal).

Projects are expected to collaborate and contribute to the activities of the Coordination and Support Action defined under the topic HORIZON-CL5-2025-D2-02-06.

To strengthen the European battery ecosystem, projects are expected to use materials, products and equipment produced in EU Member States and countries associated to Horizon Europe, unless it is demonstrated that no valid option exists.

This topic implements the co-programmed European Partnership on Batteries (Batt4EU). As such, projects resulting from this topic will be expected to report on the results to the European Partnership on Batteries (Batt4EU) in support of the monitoring of its KPIs.

**HORIZON-CL5-2026-01-D2-05: Accelerated multi-physical and virtual testing for battery aging, reliability, and safety evaluation (Batt4EU Partnership)**

<b>Call: Cluster 5 Call 01-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 7.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 15.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Eligibility</i>	The conditions are described in General Annex B. The following

<i>conditions</i>	exceptions apply:  The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 7 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>84</sup>.</p>

**Expected Outcome:** Project results are expected to contribute to all of the following outcomes:

- Shortened development time of battery cells and battery systems by minimising the experimental testing effort and thus reducing the overall costs and time in battery system development and reducing the time to market;
- Increased battery reliability and safety through better understanding of ageing, and safety-relevant (deactivation, degradation, failure) mechanisms;
- Acceleration of a more reliable verification and validation of new solutions contributing to increased user acceptability (safety, performance & costs) and competitiveness of the European battery value chain;
- Standardised battery system testing & validation approaches focussing on the combination of physical and virtual test methodologies.

**Scope:** This topic aims to reduce development costs and time to market of new battery systems by accelerated multi-physical and virtual testing. Current test strategies are still very time consuming and costly due to the need to understand the impact of multi-physical operational loads (electric, thermal, mechanical, etc.), potential failure modes, ageing and misuse on the safety and reliability of battery cells and modules.

To overcome these barriers, new multi-physical test strategies supplemented by virtual testing are required taking into account the most impactful parameters on ageing, reliability and safety and their dependencies.

<sup>84</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

Proposals are expected to address Electric Vehicle (EV) batteries and are encouraged to develop techniques and methodologies which are applicable to other forms of electro-mobility as well as stationary applications (including second life).

Proposals are expected to address and demonstrate all the following activities:

- Understand and describe the impact of multi-physical operational loads, failure modes, ageing and misuse on battery reliability and safety highlighting the dependencies between them in order to design the most adequate testing methods and parameters;
- Derive advanced operating profiles for testing and development of novel X-in-the-Loop (XiL) test environments for multi-physical and accelerated testing addressing electrical, thermal and mechanical loads at the same time;
- Combine physics-based with data-driven test strategies enabling reliable virtual and distributed battery testing considering specific applications;
- Develop simplified test strategies reducing the number of tests and their complexity while improving battery safety and reliability. Synergies between different battery chemistries, including next generation battery designs and sizes must be exploited where possible, allowing to re-use or scale test results from cell to system level;
- Research activities are also expected to lead to advanced response strategies for damaged and aged batteries as well as contribute to a European safety classification system. For the latter, the contribution to the development of standards for this safety classification is expected. To this end, proposals are expected to establish contact and exploit complementarities with selected proposals under the topic HORIZON-CL5-2025-01-D5-03 “Safe Post-crash Management of Battery Electric Vehicles (2Zero Partnership)” with regards to monitoring techniques for safety risks, algorithms for defining state of health and remaining useful life.

Activities covering the following aspects are encouraged:

- Development of virtual methods for full system validation using physical sub-system results;
- Development, exploitation, and harmonisation of advanced battery cell or pack measurement and diagnostic methods for enhancing the data depth and breadth over what is currently available. Definition of performance indicators relating to battery degradation and safety, and development of methods for the validation of digital models.
- Application of AI and generative AI for the definition of the design of experimental and testing strategies to increase the outcome of experimental testing campaigns, to accelerate achievement of significant conclusions, and to reduce testing time and effort.

Plans for the exploitation and dissemination of results for proposals submitted under this topic must include a strong business case and sound exploitation strategy, as outlined in the

introduction to this Destination. The exploitation plans are expected to include preliminary plans for scalability, commercialisation, and deployment (feasibility study, business plan) indicating the possible funding sources to be potentially used (in particular the Innovation Fund).

Proposals are expected to also establish cooperation and complementarity with the selected proposal under the topic HORIZON-CL5-2023-D2-02-03: “Creating a digital passport to track battery materials, optimise battery performance and life, validate recycling, and promote a new business model based on data sharing (Batt4EU Partnership)” with regards to safety and ageing information as part of the battery passport.

Proposals could consider the involvement of the European Commission's Joint Research Centre (JRC) whose contribution could consist of performing experimental or desk-top research on battery performance and/or safety. For further information on the JRC's possible contribution to the projects, please, search for additional publicly available information on the JRC's website (EU Science Hub) on the NCP portal, or request specific information from the JRC (JRC-NCP-Network@ec.europa.eu)

JRC shall assure that all the other applicants receive the same information on the JRC's possible contribution to the project (e.g., via the topic-specific FAQs under the Funding and Tenders Portal).

Projects are expected to collaborate and contribute to the activities of the Coordination and Support Action defined under the topic HORIZON-CL5-2025-D2-02-06.

To strengthen the European battery ecosystem, projects are expected to use materials, products and equipment produced in EU Member States and countries associated to Horizon Europe, unless it is demonstrated that no valid option exists.

This topic implements the co-programmed European Partnership on Batteries (Batt4EU). As such, projects resulting from this topic will be expected to report on the results to the European Partnership on Batteries (Batt4EU) in support of the monitoring of its KPIs.

**HORIZON-CL5-2025-02-D2-06: Fostering the European battery Ecosystem by providing Accurate and up-to-date information and stimulating Excellence in the European battery R&I community (Batt4EU Partnership)**

<b>Call: Cluster 5 Call 02-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 3.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 3.00 million.

<i>Type of Action</i>	Coordination and Support Actions
<i>Eligibility conditions</i>	<p>The conditions are described in General Annex B. The following exceptions apply:</p> <p>The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.</p>
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>85</sup>.</p>

**Expected Outcome:** Project results are expected to contribute to all of the following outcomes:

- A solid basis of information is established addressing R&I stakeholders and supporting decision making within the European battery value chain, at European, national, and regional levels, and for public and private actors alike;
- An agile European battery value chain is set up that can update its priorities based on global trends;
- Maximisation of the scientific, technological, economic, and societal impact of the BATT4EU Partnership and its projects and paving the way to industrial exploitation of their research results in key energy and transport application domains;
- A well-coordinated, best-in-the-world, battery research community is fostered in Europe, gathering excellent scientists and innovators as well as involving other relevant stakeholders;
- Excellence in battery research is spread across Europe, enhancing the wide adoption of best practices.

**Scope:** The project proposal should cover all of the following tasks:

- Animate and organise the National and Regional Coordination Group (NRCG) in coordination with the Batteries European Partnership Association (BEPA)<sup>86</sup>;

<sup>85</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

<sup>86</sup> [BATT4EU \(bepassociation.eu\)](http://BATT4EU%20(bepassociation.eu))

- Cooperate with the European Technology and Innovation Platforms (ETIPs), Important Projects of Common European Interest (IPCEIs)<sup>87</sup> and similar stakeholder fora.
- Provide support to existing SET Plan Implementation Plans and advancement towards more interconnected activities, both in terms of contents and implementation mechanisms;
- Create and maintain an online accessible platform which provides:
  - A rolling assessment of the current state-of-the-art of the battery technology, both globally and in the EU and Associated Countries;
  - An updated set of technical targets and intermediary KPIs to track the progress of the battery technology in the EU;
  - A rolling overview of open and recently closed calls on batteries from research and innovation programmes on European, national, and regional level. This task should build upon the links with the NRCCG, ETIPs, and any ongoing IPCEIs on batteries. Direct collaboration with national funding agencies is encouraged.

Proposals should include a credible strategy for how this platform could be continued beyond the time horizon of the project.

- Provide an analysis of battery roadmaps from other global regions and see how they compare to the state-of-art and targets set for the European battery technology development and propose updates to the European battery R&I strategy in a yearly report for short-, medium- and long-term research needs;
- Support monitoring efforts undertaken by the European Commission, the European Battery Alliance (EBA)<sup>88</sup> regarding the above-mentioned indicators of technological progress in Europe;
- Provide scientific animation of the Battery R&I Community, that includes the organisation of (thematic) community events to improve the overall knowledge level of the sector; ensure that projects working on similar topics can learn from each other and that projects goals converge towards the objectives of the Partnership; inform on possible funding mechanisms (e.g., Innovation Fund and the EBA One-Stop-Shop) to take developed technologies to the next level;
- Share best practices with the community and push for adoption of common data standards and reporting methodologies;
- Co-organise together with BEPA and other interested stakeholders an annual conference where BATT4EU projects can share their results; Involvement of CINEA in the sessions in which the BATT4EU projects share their results is mandatory.

<sup>87</sup> [IPCEI Batteries \(ipcei-batteries.eu\)](http://ipcei-batteries.eu)

<sup>88</sup> [Building a European battery industry - European Battery Alliance \(eba250.com\)](http://eba250.com)

Proposals could consider the involvement of the European Commission's Joint Research Centre (JRC) whose contribution could consist of providing input to or discuss technical targets or KPIs and testing the capability of the observatory to provide meaningful data for EC / JRC work. For further information on the JRC's possible contribution to the projects, please, search for additional publicly available information on the JRC's website (EU Science Hub) on the NCP portal, or request specific information from the JRC (JRC-NCP-Network@ec.europa.eu)

JRC shall assure that all the other applicants receive the same information on the JRC's possible contribution to the project (e.g., via the topic-specific FAQs under the Funding and Tenders Portal).

This topic implements the co-programmed European Partnership on Batteries (Batt4EU). As such, projects resulting from this topic will be expected to report on the results to the European Partnership on Batteries (Batt4EU) in support of the monitoring of its KPIs.

#### **HORIZON-CL5-2026-01-D2-07: Joint topic with India on recycling of EV batteries**

<b>Call: Cluster 5 Call 01-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR N/A million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 0.00 million.
<i>Type of Action</i>	Research and Innovation Actions

#### **Communities and cities**

Proposals are invited against the following topic(s):

#### **HORIZON-CL5-2025-03-D2-08: Driving Urban Transition Co-Funded Partnership**

<b>Call: Cluster 5 Call 03-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 56.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 56.00 million.

<i>Type of Action</i>	Programme Co-fund Action
<i>Eligibility conditions</i>	<p>The conditions are described in General Annex B. The following exceptions apply:</p> <p>The proposal must be submitted by the coordinator of the consortium funded under HORIZON-CL5-2021-D2-01-16: Co-Funded Partnership: Driving Urban Transitions to a sustainable future (DUT). This eligibility condition is without prejudice to the possibility to include additional partners.</p>
<i>Procedure</i>	<p>The procedure is described in General Annex F. The following exceptions apply:</p> <p>The evaluation committee will be composed partially by representatives of EU institutions.</p> <p>If the outcome of amendment preparations is an award decision, the coordinator of the consortium funded under the grant agreement that was established in response to the call topic HORIZON-CL5-2021-D2-01-16 will be invited submit an amendment to the grant agreement, on behalf of the beneficiaries.</p>
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>This action is intended to be implemented in the form of an amendment of the grant agreement concluded pursuant to topic HORIZON-CL5-2021-D2-01-16.</p> <p>For the additional activities covered by this action:</p> <ul style="list-style-type: none"> <li>• The funding rate is up to 30 % of the eligible costs.</li> <li>• Beneficiaries may provide financial support to third parties (FSTP). The support to third parties can only be provided in the form of grants.</li> <li>• Financial support provided by the participants to third parties is one of the primary activities of this action to allow the partnership to achieve its objectives. The EUR 60 000 threshold provided for in Article 204(a) of the Financial Regulation N° 2018/1046 does not apply.</li> <li>• The maximum amount of FSTP to be granted to an individual third party is EUR 5.000.000. This amount is justified since provision of FSTP is the primary activity of this action and it is based on the extensive experience under predecessors of this partnership.</li> </ul>

	<p>The starting date of the grant awarded under this topic may be as of the submission date of the application. Applicants must justify the need for a retroactive starting date in their application. Costs incurred from the starting date of the action may be considered eligible (and will be reflected in the entry into force date of the amendment to the grant agreement).</p>
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**Expected Outcome:** This topic is a continuation of the Driving Urban Transition (DUT) Co-Funded Partnership to enable the roll-out of its full strategy and action plan and assist cities in their sustainability and climate neutrality transitions. Actions will contribute to the achievement of the European Green Deal targets, the UN Agenda 2030 commitments, the Urban Agenda for the EU, the New EU Urban Mobility Framework, the Habitat III New Urban Agenda and the Paris Agreement. European cities need to engage urgently in sustainability and climate-neutrality transitions.

The partnership is expected to contribute to all of the following expected outcomes:

- Enhanced multi-level cooperation and alignment on R&I on sustainable urban development across and within cities, regions, and countries, including international outreach and cooperation with other networks and initiatives;
- EU is strengthened as a role model for R&I on sustainable urban development; cooperate with international cities and research funding networks (e.g., Belmont Forum) to align strategies and R&I agendas and strengthen the role of DUT as co-lead of the Urban Transitions Mission (UTM) under Mission Innovation (MI). In this context, potential synergies could be also considered with ongoing EU funded work related to Africa (e.g., ongoing CSAs), to enhance the implementation of DUT Strategic Research &Innovation Agenda (SRIA);
- Set up innovative, cross-sectoral, and inclusive urban governance, policy, and decision-making harnessing the full potential of social science and citizens' engagement in the city development process;
- Integrate emerging mobility and transport services, and align them with the citizens' needs and preferences;
- Foster sustainable, climate-neutral, safe, resilient, socially inclusive, liveable, and attractive, climate-friendly neighbourhoods, towns, cities and urban services, with reduced environmental footprint (e.g., burdens from other pollutants) and greenhouse emissions, and enhance well-being and quality of life for citizens;
- Empower local authorities, municipalities, businesses, social partners, civil society, knowledge institutions and citizens with necessary capacity, knowledge and skills; enhance efficient urban tools, solutions methodologies and processes to actively engage in sustainability and climate-neutrality transitions;

- Increase science and evidence-based implementation of the European Green Deal, the Urban Agenda for the EU and other European, national, regional, and local urban-relevant policies and strategies.

**Scope:** The objective of this action is to continue to provide support to the European “Driving Urban Transition” Co-funded Partnership identified in the Horizon Europe Strategic Plan 2021-2024 – first implemented under the topic *HORIZON-CL5-2021-D2-01-16: Co-Funded Partnership: Driving Urban Transitions (DUT)* – and to fund additional activities (which may also be undertaken by additional partners) in line with its intended scope and duration, and in accordance with Article 24(2) of the Horizon Europe Regulation.

The proposal should capitalise upon new collaboration opportunities offered by the Association Agreements to Horizon Europe, the “Climate neutral and smart cities” Mission and the Global Urban Transitions Mission (UTM) of Mission Innovation to enhance expertise, capacities, critical mass and broaden geographical coverage and outreach capacity. With respect to the latter, mutual benefits from international outreach, collaboration and cooperation with global and international cities and research funding networks should be pursued to align strategies and research agendas and promote scientific evidence and good practice for urban policy at international level.

Taking into account that the present action is a continuation of topic HORIZON-CL5-2021-D2-01-16 and foresees an amendment to an existing grant agreement, the proposal should describe plans, activities and initiatives that would enable the DUT to ensure, as appropriate, a seamless pursuance of its strategy, objectives and actions to fill important gaps in knowledge, evidence, innovation, technology, data, capacity and skills, integrated approaches, while fostering inclusive and participatory governance structures and assisting cities at European (and, as appropriate, global) level in designing and implementing the transition towards sustainability and climate neutrality.

The proposal should describe in detail additional activities (including additional partners) to be covered by the grant and justify their added value as compared to ongoing actions, whilst accounting for actual progresses in relevant EU and international policy frameworks and urban initiatives. The proposal is expected to cover the new work programmes for calls for proposals as from 2026 and all remaining work programmes as from 2028.

The proposal should elaborate on modalities to scale-up synergies with the works of the NetZeroCities Mission platform, CapaCITIES networks, the CRAFT platform, the Global Knowledge Exchange Centre and, as appropriate, with other EU Missions and related platforms (e.g., MIP4Adapt). Those synergies will underpin the implementation of the “Climate Neutral and Smart Cities” Mission and ensure activities’ coherence and complementarity while leveraging knowledge and investment possibilities.

Furthermore, concrete actions should be envisaged to enhance collaboration and synergies with other European Partnerships such as Clean Energy Transitions (CET), Built environment and construction (Built4People), Rescuing biodiversity (Biodiversa+), Safe and Sustainable

Food Systems, Towards Zero Emission Road Transport (2ZERO), Cooperative, Connected and Automated Mobility (CCAM), EIT Urban Mobility and Water4All.

Interfaces with public procurement and investment programmes and links with Urban Innovative Actions (UIA) under the Urban Agenda for the EU, the European Urban Initiative (EUI) under the cohesion policy, ESIF, private funds, etc. should be explored to support take-up and larger scale implementation of tested approaches and solutions.

The consortium that won the grant under topic HORIZON-CL5-2021-D2-01-16 is uniquely placed to submit a proposal to continue the envisioned partnership. It is noted that this consortium submitted the initial proposal leading to the identification of the partnership in the Horizon Europe strategic planning 2021-2024. Moreover, it has implemented the partnership through the co-funded calls in the years 2022 and 2023. In this context, the current consortium has particular expertise in relation to the objectives of the Partnership, the activities to be implemented in particular 2022 and 2023 co-funded calls, or other calls/scope of calls clearly required/envisioned pursuant to initial proposal/partnership, and other relevant aspects of the action. In practice, no other consortium would be able to continue the activities of the Partnership underway without a significant disruption of the ongoing activities.

While the grant under this topic should be attributed to a proposal submitted by the coordinator of the consortium funded under topic HORIZON-CL5-2021-D2-01-16, the consortium applying to the present topic may include additional partners and new activities, to be funded by the grant subject to an evaluation, which will take into account the existing context and the scope of the initial evaluation (as relevant), and related obligations enshrined in the grant agreement.

### **Cross-cutting**

Proposals are invited against the following topic(s):

#### **HORIZON-CL5-2025-03-D2-09: Monitoring and Evaluation of the Societal Readiness Pilot**

<b>Call: Cluster 5 Call 01-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 1.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 1.50 million.
<i>Type of Action</i>	Coordination and Support Actions
<i>Procedure</i>	The procedure is described in General Annex F. The following

	<p>exceptions apply:</p> <p>The evaluation committee will be composed partially by representatives of EU institutions.</p>
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). <sup>89</sup>.</p>

**Expected Outcome:** Societal Readiness (SR) is an indicator of R&I results, expressing they have accounted for different societal needs and concerns, thereby increasing their potential for societal uptake.

The project is expected to contribute to all of the following outcomes:

- The European Commission has a comprehensive overview on the way Societal Readiness is addressed and integrated in piloted projects, and main challenges and concerns are identified;
- A proven strategy to intensify collaboration between STEM<sup>90</sup> and SSH<sup>91</sup> partners led to in-depth interdisciplinary work in R&I projects. All involved project constituencies and relevant parts of society are accounted for in an integrated way to ensure broad and sustainable support for R&I solutions;
- The next generation of Societal Readiness projects benefits from current pilot projects' experiences, success stories and do's and don'ts thanks to a public web platform, acting as a one-stop-shop for Societal Readiness for future EU projects;
- The European Commission is equipped with a sound, clear, and replicable procedure – both at implementation and content level – presented as an improvement of the current approach, to address Societal Readiness effectively in future EU funded R&I projects.

**Scope:** The European Commission has a strong interest in learning from the implementation of Societal Readiness actions piloted in eight topics from the Cluster 5 work programme

<sup>89</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

<sup>90</sup> Sciences, Technology, Engineering and Mathematics  
<sup>91</sup> Social Sciences and Humanities

2025<sup>92</sup>, and resulting in an estimate of seventeen projects to be implemented. Conclusions on the pilot's monitoring and evaluation will be the basis for the European Commission's decision to replicate further these actions, to improve its implementation and possibly widen its use to other fields of application.

The requirements applying to pilot topics are included in the introduction of the Horizon Europe Main Work Programme 2025 for Climate, Energy and Mobility; related definitions are in the Horizon Programme Guide<sup>93</sup>.

The action is expected to analyse the way Societal Readiness is addressed and integrated in piloted projects and help in designing an efficient, clear, and impactful way of applying a Societal Readiness approach in future EU funded R&I projects with a true interdisciplinary collaboration.

The project selected should address all of the following actions:

- Based on pilot projects' documents delivered during the actions:
  - Make an analysis of the way Societal Readiness is considered and integrated in the ***Descriptions of the Actions*** of selected pilot-project in terms of content (e.g., the type of Responsible Research and Innovation (RRI) guiding questions chosen and related methodology), implementation (e.g., SR related work distribution and partners) and methodology. Assess the level, timing, and quality of interactions between SSH and STEM partners during the proposal preparation.
  - Make an analysis of all ***First reports on Societal Readiness*** to be delivered by the selected pilot-projects. Assess the way SR consideration unfolds from the ***Description of the Actions***' methodology, observe how guiding questions are addressed and plan to respond to the concerns identified. Compare the various 'SR visions' put forward by each consortium.
  - Make an analysis of the ***Final reports on Societal Readiness***, by reporting on the various projects' experiences, challenges and lessons learned, assessing the factors behind successes and failures including (but not only): participation of external actors in co-design methods, interdisciplinarity within project partners, responses to SR guiding questions, adjustment of R&I activities.
- Make an analysis of the **roll-out of the Societal Readiness activities and milestones** as implemented in the projects. Report on successes, failures, and challenges related to the concrete actions undertaken to perform 'Responsible Research and Innovation'. Study the degree of participation and the type of societal actors (i.e., any group of people

<sup>92</sup> HORIZON-CL5-2025-03-D1-06; HORIZON-CL5-2025-02-D3-04; HORIZON-CL5-2026-02-D4-02; HORIZON-CL5-2025-01-D5-01; HORIZON-CL5-2025-01-D5-10; HORIZON-CL5-2025-01-D6-01; HORIZON-CL5-2025-01-D6-02; HORIZON-CL5-2025-01-D6-11

<sup>93</sup> See in particular definitions on 'Societal Readiness', 'Responsible Research and Innovation', 'Social Sciences and Humanities'

external to the sole consortium) whose voices were actually considered and responded to.

- Analyse the various **interdisciplinarity** mechanisms (SSH vs. STEM) across pilot-projects as well as their effectiveness in practice. Identify successful interdisciplinary approaches and less successful ones. This aspect should be assessed for all phases of pilot-projects, and possible evolutions in partners behaviours, or changes in interdisciplinary strategies should be identified. The degree of involvement of non-SSH partners in SR activities, as well as the way they perceive them (in a positive or negative way) should also be scrutinised. Issue a publication with concrete tips helping future project partners integrating implementable, efficient, and well-accepted interdisciplinary practices both within consortia and towards external actors.
- Organise **annual workshops** in physical format to allow all pilot project representatives to meet, interact and exchange experiences periodically. Travel costs for all participants are to be covered by this action.
- Set up a **public web platform** during the action duration, to provide a direct source of support to future SR users, including examples of SR pathways, do's and don'ts, tips and tricks on both practical and theoretical issues such as methodology, interdisciplinarity in practice, societal actors reach out, potential additional RRI guiding questions etc. A survey submitted beforehand to pilot-projects partners could be envisaged to help in defining those needs. The platform should be updated and completed on a regular basis.
- Provide a set of **recommendations to the European Commission** taking stock of the above-mentioned analysis as well as of the recommendations elaborated by pilot-projects in their *Final reports on Societal Readiness*. Clear and accurate improvements of the current Societal Readiness approach should be proposed to overcome identified shortcomings, while at the same time, acknowledging the successful aspects of the current approach. The overall Societal Readiness vision<sup>94</sup> should be kept in mind when providing those recommendations, while aiming at keeping a lowest level of implementation complexity, a highest degree of understandability (including for non-SSH experts) and replicability to various technology maturities and fields of applications, as well as a strong interdisciplinary component.

In addition, mid-project recommendations, based on the conclusions from pilot-projects *Descriptions of the Actions* and *First reports on Societal Readiness* (see two first point above) are expected. They will give a preliminary sense of directionality to the following generation of Societal Readiness projects which might start earlier than the end of pilot projects' duration.

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<sup>94</sup> Societal Readiness is a characteristic of R&I results, indicating they have accounted for different societal needs and concerns, thereby increasing its potential for societal uptake and transition towards societal adaptation. Working towards Societal Readiness means to better understand that R&I should be driven by the needs, values, and expectations of diverse social groups, inclusive and transparent in processes and outcomes, active in identifying, mitigating, and avoiding negative social, environmental, and economic externalities.

The action should also provide an analysis of the differences in set-up, implementation and outcome of the SR pilot topics compared to SSH-flagged-only-topics and explore other existing Societal Readiness routes applied R&I projects in the area of to Climate, Energy and Mobility, external to the Horizon Europe framework programme.

Relevant information on e.g. on perceptions, concerns, past experiences on ways of working should be collected via direct interactions (bilateral discussions with respective project partners and through the annual workshops).

A duration of 42 months is recommended for this action.

The proposed action requires the effective contribution of relevant SSH disciplines including the involvement of SSH experts to proficiently support the monitoring and evaluation of Societal Readiness pilot-projects in Cluster 5 work programme 2025.

### **HORIZON-CL5-2025-02-D2-10: Clean Energy Transition Co-Funded Partnership**

<b>Call: Cluster 5 Call 02-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 69.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 69.00 million.
<i>Type of Action</i>	Programme Co-fund Action
<i>Eligibility conditions</i>	<p>The conditions are described in General Annex B. The following exceptions apply:</p> <p>The proposal must be submitted by the coordinator of the consortium funded under HORIZON-CL5-2021-D3-01-04 Clean Energy Transition. This eligibility condition is without prejudice to the possibility to include additional partners.</p>
<i>Procedure</i>	<p>The procedure is described in General Annex F. The following exceptions apply:</p> <p>The evaluation committee can be composed partially by representatives of EU institutions.</p> <p>If the outcome of amendment preparations is an award decision, the coordinator of the consortium funded under the topic HORIZON-CL5-2021-D3-01-04 will be invited to submit an amendment to the grant agreement, on behalf of the beneficiaries.</p>

<p><i>Legal and financial set-up of the Grant Agreements</i></p>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>This action is intended to be implemented in the form of an amendment to the grant agreement concluded pursuant to topic HORIZON-CL5-2021-D3-01-04.</p> <p>For the additional activities covered by this action:</p> <ul style="list-style-type: none"><li>• The funding rate is up to 30 % of the eligible costs.</li><li>• Beneficiaries may provide financial support to third parties (FSTP). The support to third parties can only be provided in the form of grants.</li><li>• Financial support provided by the participants to third parties is one of the primary activities of this action to allow the partnership to achieve its objectives. The EUR 60 000 threshold provided for in Article 204 (a) of the Financial Regulation N° 2018/1046 does not apply.</li><li>• The maximum amount of FSTP to be granted to an individual third party is EUR 5.000.000. This amount is justified since provision of FSTP is the primary activity of this action and it is based on the extensive experience under predecessors of this partnership.</li></ul> <p>The starting date of the grant awarded under this topic may be as of the submission date of the application. Applicants must justify the need for a retroactive starting date in their application. Costs incurred from the starting date of the action may be considered eligible and will be reflected in the entry into force date of the amendment to the grant agreement.</p>
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Expected Outcome: This topic is a continuation of the Clean Energy Transition Co-fund partnership (CET Partnership) and constitutes the EU contribution for the period 2025-2027.

The third instalment of the partnership will contribute to the expected outcomes specified in topic *HORIZON-CL5-2021-D3-01-04: Clean Energy Transition, for continuation and development of new activities*.

The partnership is expected to contribute to all of the following expected outcomes:

- Increased directionality of clean energy transition research and innovation in EU and Associated Countries in line with the SET Plan thanks to a shared pan-European vision on the goal and direction of required system transformation processes, adapted to regional needs and availability of renewable energy resources;

- Evidence based energy and climate policy formulation;
- A wider systemic transition and energy supply required for a climate neutral economy in all sectors of society; enabling the transition of the built environment, transport, industry and other sectors to clean, low carbon energy;
- An innovation ecosystem for Europe's transition to clean energy and contribution to a resource and energy efficient system, both from an ecological and economic standpoint;
- A building block to a zero-emission energy system for the decarbonisation of transport, buildings, industry, agriculture in the specific European environment;
- Increased engagement of consumers and prosumers and appropriate demand-response mechanisms integrated in the energy system;
- And finally, an energy system that meets the needs of different parts of society, in different geographical locations (urban and rural) and different groups.

**Scope:** The Clean Energy Transition co-funded Partnership (CET Partnership) is a transnational initiative on joint R&I programming to boost and accelerate the energy transition, building upon regional and national R&I funding programmes.

It aims at empowering the energy transition and contributing to the EU goal of becoming the first climate-neutral continent by 2050, by pooling national and regional R&I funding for a broad variety of technologies and system solutions required to achieve the transition. It will foster innovation ecosystems from the very local and regional level, up to the transnational European level, thus overcoming a fragmented European landscape. The CET Partnership enables national and regional R&I programme owners and managers from Member States and Associated Countries to align their priorities and implement annual joint calls from 2022 to 2027. The Partnership also organises joint accompanying activities to enable a dynamic learning process, extracts strategic knowledge and accelerates the upscaling, replication, and market diffusion of innovative solutions to maximise impact and foster the uptake of cost-effective clean energy technologies.

The common vision of the CET Partnership is already expressed in its Strategic Research and Innovation Agenda (SRIA) that has been co-created with the involved countries, the EU SET Plan Implementation Working Groups and ETIPs, all energy relevant ERA-Nets as well as the EERA joint programmes (over 500 editors, co-authors, commenters, and discussants). The SRIA articulates the common goal of (1) building a transnational transformative Joint Programming Platform, (2) developing and demonstrating technology and solutions for the transition of energy systems, and finally (3) building innovation ecosystems that support capacity building at all levels.

The objective of this action is to continue to provide support to the European Clean Energy Transition Co-fund Partnership identified in the Horizon Europe Strategic Plan 2021-2024 and first implemented under topic HORIZON-CL5-2021-D3-01-04, and in particular to fund additional activities (which may also be undertaken by additional partners) in view of its

intended scope and duration, and in accordance with Article 24(2) of the Horizon Europe Regulation.

The new geopolitical and energy market realities require to drastically accelerate the clean energy transition and increase energy independence from unreliable suppliers and volatile fossil fuels. In support to the objectives of REPowerEU<sup>95</sup> it is expected that the partnership explores pathways and develops new actions to reinforce R&I investments (and utilisation of R&I results) accelerating the clean energy transition.

It is expected that the European Clean Energy Transition Co-Fund Partnership reinforces its ambition considering the revised SET Plan and continues the implementation of its SRIA by setting up joint calls in 2025, 2026 and 2027. In addition, the partnership is invited to setup joint calls without co-funding from the European Union.

The consortium that won the grant under topic HORIZON-CL5-2021-D3-01-04 is uniquely placed to submit a proposal to continue the envisioned partnership. With regards to the various activities already undertaken in previous years, no other consortium is able to continue the activities of the Partnership underway without a significant disruption of the ongoing activities.

While the grant under this topic should be attributed to a proposal submitted by the coordinator of the consortium funded under topic HORIZON-CL5-2021-D3-01-04, the consortium applying to the present topic may include additional partners and new activities, to be funded by the grant subject to an evaluation, which will take into account the existing context and the scope of the initial evaluation (as relevant), and related obligations enshrined in the grant agreement.

### **HORIZON-CL5-2025-02-D2-11: Support to the SET Plan community**

<b>Call: Cluster 5 Call 02-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 0.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 7.50 million.
<i>Type of Action</i>	Coordination and Support Actions
<i>Award criteria</i>	The criteria are described in General Annex D. The following exceptions apply: Only up to one project will be funded in each of the following sectors:

<sup>95</sup>

[REPowerEU: affordable, secure and sustainable energy for Europe | European Commission \(europa.eu\)](#)

	<ul style="list-style-type: none"> <li>• geothermal energy</li> <li>• hydropower</li> <li>• ocean energy</li> <li>• photovoltaics</li> <li>• renewable fuels and bioenergy</li> <li>• solar thermal energy</li> <li>• renewable heating and cooling</li> <li>• direct solar fuels</li> <li>• wind energy</li> <li>• energy efficiency in buildings</li> <li>• sustainable and efficient energy use in industry</li> <li>• direct current technologies</li> <li>• carbon capture storage and use</li> <li>• hydrogen</li> <li>• energy systems</li> </ul>
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>96</sup></p>

Expected Outcome: In 2015, the launch of the Energy Union saw the SET Plan (Strategic Energy Technology Plan) incorporated as the Energy Union's fifth pillar on 'Research, Innovation and Competitiveness'. With the 2023 Communication on the revision of the SET Plan, its strategic objectives were harmonised with the European Green Deal, REPowerEU and the Green Deal Industrial Plan. Moreover, the SET Plan became a structural policy under the European Research Area. In 2024, the SET Plan was enshrined in the Net Zero Industry Act and the SET Plan Steering Group was established as a high-level expert group.

<sup>96</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

Depending on the sector, European Technology and Innovation Platforms (ETIPs), and/or SET Plan Implementation Working Groups (IWGs) and/or similar stakeholder fora support the development and implementation of the SET Plan priorities by bringing together relevant stakeholders in key areas from industry, research organisations and, where applicable, SET Plan countries' government representatives.

It is crucial for the clean energy transition that the SET Plan stakeholder fora align and coordinate their activities.

Project results are expected to contribute to all of the following outcomes:

- European climate and energy policies are supported by science-based evidence.
- The implementation of the SET Plan and its contribution to the Green Deal Industrial Plan, the Net Zero Industry Act and the European Research Area are facilitated.
- The SET Plan stakeholder fora are recognised as key players in the clean energy transition.
- The societal and economic effects of the clean energy transition are addressed through the consideration of interests, needs and concerns of end users and actors across the value chain of the respective technology sectors.

**Scope:** The projects are expected to support ETIPs and/or IWGs and/or stakeholder fora in one of the sectors listed below, taking into consideration the specific needs of the sector they address, the emerging European policy priorities, and the coordination with other initiatives (to avoid overlaps).

The proposals are expected to address one of the following sectors: geothermal energy, hydropower, ocean energy, photovoltaics, renewable fuels and bioenergy, solar thermal energy, renewable heating and cooling, direct solar fuels, wind energy, energy efficiency in buildings, sustainable and efficient energy use in industry, direct current technologies, carbon capture storage and use, hydrogen, and energy systems.

In line with the Recovery Plan for Europe and the latest EU climate and energy related policies (notably the National Energy and Climate Plans), stakeholder fora are expected to develop research and innovation roadmaps and/or analyses (e.g., strategic research and innovation agendas, strategic reports, industrial strategies, analyses of market opportunities and funding needs, studies on innovation barriers, assessments of their sectors' contribution to the European competitiveness and strategic autonomy). Special attention should be given, as appropriate, to the key challenges of the European Green Deal, the Green Deal Industrial Plan and the Net Zero Industry Act, including (but not limited to) energy security, technological pushback, industrial production and competitiveness, supply chain security and dependencies, access to market, circularity, advanced materials, digitalisation, societal transformation, skills, and just transition. Moreover, as appropriate, the projects are expected to address the contribution to the goals of the European Research Area in the field of energy, in particular

the achievement of the 3% GDP target of public and private spending on research and innovation.

The stakeholder fora should ensure the participation of industrial players (including SMEs), research and civil society organisations, universities and European associations representing relevant sectors (as applicable) across several SET Plan countries, establishing links with national authorities. To maximise impact, the projects are encouraged to develop and implement robust outreach approaches to widen participation from across the EU and associated countries. As appropriate, societal needs and interests should be considered in the activities of the fora, so that inequalities and employment issues are addressed. Where applicable, the stakeholder fora should establish synergies with relevant Horizon Europe European Partnerships.

The projects are encouraged to implement dissemination and networking activities with other relevant projects (e.g., joint workshops, thematic conferences, webinar series, regular exchanges, etc.).

Relevant outputs of the projects will feed into the SET Plan information system (SETIS), the annual SET Plan progress report and the Commission's Clean Energy Technology Observatory. As appropriate, the projects should provide data and analysis tracking the progress of the different technologies towards the EU targets, for instance those set out by the Net Zero Industry Act (e.g., the implementation of non-price criteria), the Critical Raw Materials Act, and the Renewable Energy Directive (e.g., the target for innovative renewable energy technologies to represent at least 5 % of newly installed renewable energy capacity by 2030). Data should be accessible and reusable according to the FAIR data principles (Findable, Accessible, Reusable, Interoperable). The projects are expected to contribute to the reporting of the SET Plan to the European Parliament and the Council.

The projects should prepare new (or update existing) finance and sustainability plans for future continuation of the stakeholder fora without EU funding.

If relevant, this topic requires the effective contribution of SSH disciplines and the involvement of SSH experts, institutions as well as the inclusion of relevant SSH expertise, to produce meaningful and significant effects enhancing the societal impact of the related research activities.

The indicative project duration is two years.

#### **HORIZON-CL5-2025-02-D2-12: NZIA regulatory sandbox exchange forum support**

<b>Call: Cluster 5 Call 02-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per</i>	The Commission estimates that an EU contribution of around EUR 0.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a

<i>project</i>	proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 0.50 million.
<i>Type of Action</i>	Coordination and Support Actions
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>97</sup></p>

Expected Outcome: The framework of measures for strengthening Europe's net-zero technology manufacturing ecosystem (Net-Zero Industry Act) was adopted<sup>98</sup> in 2024, establishing a requirement for Member States to set up net-zero regulatory sandboxes<sup>99</sup> in order to promote innovation and regulatory learning in the field of net-zero technologies. This instrument allows for testing of innovative net-zero technologies in real-world environment for a limited amount of time and with a view of potential scaling up and further wider deployment. Those innovative technologies could eventually be essential to achieve the Union's climate neutrality objective and to ensure the security of supply and resilience of the Union's energy system. Regulatory sandboxes contribute to better regulation<sup>100</sup> and to the New European Innovation Agenda's<sup>101</sup> flagship on experimentation spaces.

According to the Regulation, Member States designate one or more contact points for setting up net zero regulatory sandboxes and the net zero Europe Platform is assigned to coordinate Member States' activities and cooperation on net zero regulatory sandboxes. For the wider and accelerated deployment of innovative net-zero technologies it is crucial that the assigned contact points and competent authorities coordinate their activities, exchange information on lessons learnt and good practices and cooperate, including possible cross-border implementation.

Project results are expected to contribute to all of the following outcomes:

<sup>97</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

<sup>98</sup> Regulation (EU) 2024/1735 of the European Parliament and of the Council on establishing a framework of measures for strengthening Europe's net-zero technology manufacturing ecosystem and amending Regulation (EU) 2018/1724

<sup>99</sup> It means a scheme that enables undertakings to test innovative net-zero technologies and other innovative technologies in a controlled real-world environment, under a specific plan, developed and monitored by a competent authority

<sup>100</sup> Tool 69 of better regulation toolbox of the European Commission.

<sup>101</sup> COM(2022) 332 of 5.7.2022

- Regulatory learning of how regulation supports or hampers the enhanced use of innovative net-zero technologies;
- Net zero regulatory sandboxes schemes are well established, streamlined and designed;
- The net zero Europe Platform actively and smoothly exchanges information among Member States (contact points and competent authorities) and stakeholders thanks to the support of the project.

**Scope:** Covering all of the following points proposals are expected to:

1. Provide support to the goals of the net zero Europe Platform related to net zero regulatory sandboxes and to reach out to stakeholders involved in net zero regulatory sandboxes across Member States (including assigned contact points, competent authorities, potential participating entities, including SMEs and start-ups, consumers and other stakeholders). They should support exchanging best practices, lessons learnt and enhancing cooperation between Member States, as well as the coordination with other similar initiatives.
2. Prepare comparative analyses and assessments of the national legislative frameworks for net zero regulatory sandboxes and other regulatory sandboxes relevant for innovative net zero technologies in line with the Regulation on strengthening Europe's net-zero technology manufacturing ecosystem:
  - on regulatory barriers for innovative net zero technologies;
  - on national net-zero regulatory sandbox schemes (including application procedures);
  - on concrete trials;
  - on impacts and regulatory learning;
  - on lessons learnt
  - and explore other forms of regulatory experimentation for net zero technologies in the energy sector.
1. Create and regularly update a publicly available free repository on regulatory sandbox schemes and concrete projects for net zero technologies in the Union.

Proposals actively include the contribution of national authorities, companies (industry and SMEs), research and civil society organisations, consumers' and users' associations, universities and European associations representing relevant sectors and any other stakeholders related to net zero regulatory sandboxes. To maximise their impact and widen participation, they are encouraged to develop and implement robust outreach approaches and societal engagement actions to span across the EU.

Proposals are expected to include appropriate means to particularly take into account the experience and possibilities of SMEs and start-ups as potential participants in regulatory sandbox schemes fostering innovation and regulatory learning.

Furthermore, the proposals should develop a dissemination and exploitation strategy and implement dissemination and networking activities.

The project is expected to contribute to the Commission's reporting on the results of the implementation of net-zero regulatory sandboxes (including good practices, lessons learnt and recommendations on their setup and, on the application, within the net-zero regulatory sandbox, of Union law in a manner adapted for the purposes of the net-zero regulatory sandbox).

Proposals submitted under this topic are expected to include actions designed to ensure the accessibility and reusability of data produced during the project. The project should include a finance and sustainability plan for future continuation beyond the lifetime of the project.

Projects should be designed for a duration of three years.

**HORIZON-CL5-2025-02-D2-13: Placeholder: Joint topic with India on waste to renewable hydrogen**

<b>Call: Cluster 5 Call 02-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR N/A million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 0.00 million.
<i>Type of Action</i>	Research and Innovation Actions

## **Sustainable, secure and competitive energy supply**

This Destination includes activities targeting a sustainable, secure and competitive energy supply. In line with the scope of cluster 5, this includes activities in the areas of renewable energy; energy system, grids and storage; as well as Carbon Capture, Utilisation and Storage (CCUS).

This Destination contributes directly to the Strategic Plan's **Key Strategic Orientations** '*Green transition*', '*Digital transition*' and '*A more resilient, competitive, inclusive and democratic Europe*'.

In line with the Strategic Plan, the overall **expected impact** of this Destination is to contribute to the '*Ensuring more sustainable, secure and competitive energy supply through solutions for smart energy systems based on renewable energy solutions*'.

This destination contributes to the activities of the Strategic Energy Technology Plan (SET Plan) and its implementation working groups.

### **The main impacts to be generated by topics under this Destination are:**

#### **Renewable energy**

1. Energy producers have access to competitive European renewable energy and renewable fuel technologies and deploy them to enhance the EU's energy security. This will contribute to the 2030 "Fit for 55" targets (in particular, at least 42.5% renewable energy share and aiming for 45% in the EU energy consumption, 5.5% advanced biofuels and renewable fuels of non-biological origin share in EU fuel consumption). It will also contribute to the indicative target of at least 5% innovative renewable energy technology for the newly installed renewable energy capacity. By 2050, climate neutrality in the energy sector will be achieved in a sustainable way in environmental (e.g., biodiversity, multiple uses of land and water, natural resources, pollution) and socioeconomic terms, and in line with the Sustainable Development Goals.
2. Technology providers have access to European, reliable, sustainable, and affordable value chains of renewable energy and renewable fuel technologies.
3. Economic sectors benefit from better integration of renewable energy and renewable fuel-based solutions that are among others cost-effective, efficient, flexible, reliable, and sustainable. Such integration is facilitated by digital technologies and by renewable energy technologies that provide network stability and reliability.
4. European researchers benefit from a stronger community and from a reinforced scientific basis on renewable energy and renewable fuel technologies, also through international collaborations.
5. European industries benefit from a reinforced export potential of renewable energy and renewable fuel technologies, also through international collaborations.

6. European industries become frontrunners and maintain technological leadership in innovative renewable energy technologies in line with the energy union strategy.
7. European citizens, including disadvantaged and vulnerable groups, have access to an energy market that is affordable, fair and equitable, more resilient, uses all different types of local renewable energy resources, and is less dependent on fossil fuels. Local communities benefit from a more decentralised and secure energy system and from multiple uses of land and water. Less citizens experience fuel and energy poverty.
8. Strategic Energy Technology Plan (SET Plan) implementation working groups on solar photovoltaics, solar thermal technologies, renewable fuels and bioenergy, wind energy, geothermal energy, and ocean energy benefit from a reinforced scientific basis and collaboration on renewable energy and renewable fuel technologies towards meeting the ambitious targets of the European Green Deal.

#### *Energy systems, grids & storage*

R&I actions will support the just digital and green transformation of the energy system through advanced solutions for accelerating the energy systems integration and decarbonisation. The developed clean, sustainable solutions will contribute to making the energy system and supply more reliable, resilient, and secure. The solutions will contribute to increase flexibility and grid hosting capacity for renewables through optimising cross sector integration and grid scale storage. They will enhance the competitiveness of the European value chain, reduce pressure on resources (also by making technologies ‘circular by design’) and decrease dependencies.

Innovative and cost-effective energy storage (integration) solutions are developed, that provide flexibility to the energy system, reduce total cost of grid operation and enhancement and that minimise the use of critical raw materials and ensure, to the best extent possible, their reuse and recycling, are key elements of the energy system.

#### *Carbon capture, use and storage (CCUS) and carbon dioxide removal (CDR)*

1. Accelerated development of carbon capture, use and storage (CCUS) as a CO<sub>2</sub> emission mitigation option in electricity generation, in industry applications and carbon dioxide removal technologies (including conversion of CO<sub>2</sub> to energy products).
2. Reduced EU’s dependency on imported fossil fuels and increased energy security, reduced energy system’s vulnerability to the impacts of the changing climate.

#### **Global leadership in renewable energy**

Proposals are invited against the following topic(s):

**HORIZON-CL5-2026-02-D3-01: Large-scale production of liquid advanced biofuels and renewable fuels of non-biological origin**

<b>Call: Cluster 5 Call 02-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 11.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 33.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Procedure</i>	<p>The procedure is described in General Annex F. The following exceptions apply:</p> <p>To ensure a balanced portfolio, grants will be awarded to proposals not only in order of ranking but at least also to one proposal that is the highest ranked within the area of liquid advanced biofuels and at least also to one proposal that is the highest ranked within the area of liquid renewable fuels of non-biological origin, provided that proposals attain all thresholds (and subject to available budget). This condition to ensure a balanced portfolio will also be considered to be met if a proposal addressing both areas is funded.</p>

Expected Outcome: A quite wide portfolio of technologies, which are close to be deployed but still lack the real-world demonstration of economic viability, exists. Significant volumes of advanced biofuels and renewable fuels of non-biological origin (RFNBOs) are needed to cover the current fleets and the sectors where renewable fuels are the main long-term solution, such as aviation and shipping and energy-intensive industries. Therefore, an exceptional effort is needed to establish more successful projects where full-scale plants are built and operated based on the vast potential of sustainable feedstocks throughout the EU.

Project results are expected to contribute to all of the following expected outcomes:

- Energy producers and consumers in transport and energy-intensive industries benefit from the mobilisation of building of industrial capacity for advanced biofuels and renewable fuels of non-biological origin;

- Technology developers benefit from the support to the preparation of first-of-a-kind plants of advanced biofuels and renewable fuels of non-biological origin to become precursors for the following commercial plants;
- Technology providers benefit from the de-risking of the innovative technologies, reduction of CAPEX and production costs, boosting of scale-up and contribution to market up-take of advanced biofuels and renewable fuels of non-biological origin;
- Public authorities, citizens, researchers, and industrial stakeholders benefit from the improvement of the sustainability, reliability, robustness, and security of the relevant value chain;
- National authorities profit from the provided evidence for innovative advanced biofuels and renewable fuels of non-biological origin technologies, which can contribute to the Renewable Energy Directive indicative target for innovative renewable energy technology in each Member State of at least 5 % of newly installed renewable energy capacity by 2030, as well as to the targets under ReFuelEU Aviation and FuelEU Maritime.
- Policy makers and regulators profit from the provided factual information and evidence in view of their decision as regards accelerating permitting procedures, harvesting benefits from multiple uses of land and water and increasing the responsiveness of research and innovation in that field to diverse societal interests and concerns;

The implementation of the Strategic Energy Technology Plan (SET Plan) Action for Renewable Fuels and Bioenergy is supported and facilitated.

**Scope:** Demonstrate innovative large-scale production of liquid advanced biofuels and/or renewable fuels of non-biological origin with specific need for such fuels (particularly aviation and shipping and energy-intensive industries). Production will be based on various EU sustainable biomass feedstocks, notably biogenic residues and wastes, and on non-biological origin feedstocks, such as renewable hydrogen and CO<sub>2</sub> or renewable carbon, nitrogen, or their compounds, through chemical, biochemical, biological, and thermochemical pathways, or a combination of them. Proposals will demonstrate large scale production of ready-to-deploy advanced biofuels and renewable fuels of non-biological origin, engaging feedstock developers and suppliers, technology developers, fuel suppliers, end users for purchasing the quantities, national bodies, and public or private authorities with funding capacity. Proposals will address and assess the impact of actual, real-size feedstocks, (like for example agricultural wastes, energy crops grown on marginal and degraded lands or as intermediate crops, forestry wastes, biogenic municipal and industrial wastes, all types of renewable hydrogen, actual streams of CO<sub>2</sub> and nitrogen, available renewable carbon or their compounds), in terms of their constitution on plant design, (e.g. for feedstock pretreatment and wastewater treatment as appropriate). They will also address and assess the impact on plant design and feasibility of improving the feedstocks externally and upstream to the fuel production plant, by increasing the energy density of the feedstocks through for example torrefaction, by homogenisation of feedstocks for making them uniform or similar, and by

standardisation of feedstocks, as appropriate. Projects should produce a lifetime cycle analysis of their production route and in particular for renewable fuels of non-biological origin, as inputs in terms of renewable energy and material (CO<sub>2</sub>, nitrogen, renewable hydrogen) may not be continuously available. Large-scale production of renewable hydrogen as an end-product is excluded from the scope of this topic.

The projects will result in reference cases for ready-to-build, revamp/reuse and/or operate full-scale plants of advanced biofuels and renewable fuels of non-biological origin. Improvements, optimisation, new schemes and modification of existing demonstration plants that can result into the preparation of the next full-scale plant are considered eligible to encourage deployment of cost-effective solutions.

The plan for the exploitation and dissemination of results should include a strong investment and business case and sound exploitation strategy. The exploitation plan should include plans for scalability, commercialisation, and deployment. It will provide information and assessment about the economic viability of the commercial plant, the permitting procedures, a full value chain-based business plan and identified funding sources such as private equity, loans, loans guarantee, grants, or public financing for CAPEX and OPEX, as well as take-off agreements for the fuel uptake. Moreover, they should provide information on, or linked to, the identified funding sources, like private equity, the InvestEU, the EU Catalyst Partnership, the Innovation Fund, and possibly the Regional Development policy funds. Projects must include at least one relevant local economic business case, outlining local value and supply chains and the expected number of local jobs at the place of deployment. Furthermore, proposals will provide information and assessment of impact on land and water use, soil and biodiversity, for example in relation to marginal and degraded land feedstocks, and of public awareness on full-scale renewable fuel plants.

An assessment of the sustainability and the GHG reduction from fossil equivalents should be shown based on a life-cycle analysis for the large-scale fuel production. Special attention should be paid to estimating the GHG emissions reduction potential; projects will be encouraged to use the methodology in the Innovation Fund.

**HORIZON-CL5-2026-02-D3-02: Competitiveness, energy security and integration aspects of advanced biofuels and renewable fuels of non-biological origin value chains**

<b>Call: Cluster 5 Call 02-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 8.00 million.

<i>Type of Action</i>	Research and Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 5 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). <sup>102</sup>.</p>

**Expected Outcome:** European energy security and industrial competitiveness are contested by the geopolitical circumstances and market situations around the world. Advanced biofuels and renewable fuels of non-biological origin are in EU's portfolio of technologies that contribute to net-zero manufacturing in Europe. However, remaining challenges impacting the security of supply and competitiveness of these technologies and the integration of their value chains need to be clearly understood, presented, and mitigated.

Project results are expected to contribute to all of the following expected outcomes:

- Energy consumers benefit from the contribution to improved EU energy security and industrial competitiveness of renewable fuel technologies;
- Energy producers and consumers benefit from the improved reliability, robustness and security of renewable fuel technologies (compared to existing ones);
- Diverse stakeholders, e.g., policy makers, public authorities, citizens, researchers, and industry, profit from the enhancement of common knowledge and understanding about existing opportunities of integrated value chains for advanced biofuels and renewable fuels of non-biological origin;

Multi stakeholders, e.g., policy makers, technology developers, researchers, industrial and any other relevant stakeholders to the value chain, profit from the generation of multi benefits of promoting sustainable development and sustainable agriculture regarding climate change resilience and regenerative practices, accelerating renewable fuel innovation, and maximising carbon removals.

**Scope:** Projects will assess the energy security and industrial competitiveness aspects of value chains for advanced biofuels and renewable fuels of non-biological origin, in view of the new

<sup>102</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

situation in the EU regarding energy security and industrial competitiveness with the rest of the word. They will also evaluate how these technologies could contribute to the EU's energy security and industrial competitiveness through detailed value chain analysis and development of future scenarios, macroeconomic modelling, and strategic decision-making methods. Value chains closer to commercialisation with the potential to contribute more to the EU 2030 targets for green transition and industrial competitiveness and value chains for technologies under development with the potential to contribute to the longer term and could duly adopt mitigation measures, are both in scope. Proposals will identify the research and innovation actions needed to improve the energy security and industrial competitiveness aspects of these value chains, and implement as appropriate research activities for such optimisation, as well as new standards definitions for advanced biofuels and RFNBOs as appropriate.

Competitiveness, energy security and integration challenges of the various steps in a value chain and of the relevant stakeholders will be addressed. Proposals will coordinate efforts towards development of win-win integrated solutions of sustainable value chains for advanced biofuels and renewable fuels of non-biological origin engaging all relevant stakeholders, including as relevant farmers, CO<sub>2</sub> suppliers, technology providers, researchers, fuel producers, end users, policy makers, international organisations. Multidisciplinary issues related to advanced biofuels and renewable fuels of non-biological origin production, carbon removals, CO<sub>2</sub> trading and valorisation, sustainable farming, production of nature-based soil amendments, fertilizers, and organic materials, fuel standardisation, trade-off/synergies of carbon farming with in-situ carbon storing and of land uses for fuels versus solar panels for derived fuels, will be considered, to achieve benefits for all through the integration.

Value chains of renewable hydrogen as an end-product are excluded from the scope of this topic.

A sustainability assessment of integrated solutions including techno-economic, environmental and social aspects will be carried out based on life cycle analysis.

**HORIZON-CL5-2025-02-D3-03: Novel approaches to geothermal resources development**

<b>Call: Cluster 5 Call 02-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 10.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 20.00 million.
<i>Type of Action</i>	Innovation Actions

<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Procedure</i>	<p>The procedure is described in General Annex F. The following exceptions apply:</p> <p>To ensure a balanced portfolio, grants will be awarded to proposals not only in order of ranking but at least also to one proposal that is the highest ranked within the area of shallow geothermal (0-500 m depth) and at least also to one proposal that is the highest ranked within the area of deep geothermal (above 500 m depth), provided that proposals attain all thresholds (and subject to available budget). This condition to ensure a balanced portfolio will also be considered to be met if a proposal addressing both areas is funded.</p>

**Expected Outcome:** Project results are expected to contribute to all of the following expected outcomes:

- Developers and energy providers benefit from de-risking and cost reduction of geothermal resource development;
- Citizens benefit from energy efficient, sustainable, generation of electricity, direct heat, and/or heating and cooling from geothermal resources in a wide range of geological settings;
- Technology leadership, competitiveness, and technology export potential of European industry in the geothermal energy supply chain are increased;
- The technological innovation is environmentally sound, aligned with societal values, norms and behavioural aspects of end users and actors across the whole geothermal value chain, improving energy justice and citizenship.

**Scope:** Support will be given to the demonstration of innovative approaches to resource development in the following areas: (i) shallow geothermal (0-500 meter-depth) and/or (ii) deep geothermal (beyond 500 meter-depth).

Drilling and subsurface engineering account for a large part of the costs of geothermal projects, and on-field project development contains significant risks due to inherent geological uncertainties. Reducing costs upfront, improving performance, estimating uncertainty, and reducing risk can therefore boost the geothermal capacity deployment rate.

The scope covers advances beyond the state of the art in one/several of the following areas:

- subsurface engineering;
- well design, drilling and completion;
- reservoir characterisation and development planning.

Proposals can include robot and AI-physics-based simulation solutions for geothermal resource development, optimisation of the penetration rate, advanced drilling fluids, new materials for casing, cementing and completion, working fluids, logging while drilling, wireline technologies and geosteering high temperature electronics, well architecture and stimulation, closed loop technology, enhanced production pumps, and innovative monitoring systems during geothermal resources exploitation including their integration in digital twins.

Proposals are expected to reduce project development time while ensuring safety of operations and adaptation to specific geothermal environments (including offshore), constraining and quantifying geological uncertainties, reducing field development and seismic risks. They can include standardisation of the drilling equipment enhanced well production, enhanced environmental performance, improve component resistance to corrosion, scaling, high temperature, wear, and mechanical failures, increase energy extraction.

The project must include a clear go/no-go milestone ahead of entering the demonstration phase. Before this go/no-go milestone, the project must deliver the detailed engineering plans, a techno-economic assessment, and all needed permits for the demonstrator. The project proposal is expected to present a clear and convincing pathway and timeline to obtaining the permits.

Environmental impact of the proposal should be assessed, and mitigation measures considered.

Where relevant, the project is expected to follow FAIR data principles, adopt data quality standards, data integration operating procedures and GDPR-compliant data sharing/access good practices developed by the European research infrastructures.

In order to enhance the benefits of the technology, proposals are expected to develop understandings of how the utilisation of geothermal resources aligns with the cultural values and contextual settings at local to regional level and increase the responsiveness of geothermal energy to diverse societal interests and concerns. To achieve that, an inclusive, early and continuous societal engagement should be enhanced.

In particular, this topic requires the effective contribution of SSH disciplines and the involvement of SSH experts, institutions as well as the inclusion of relevant SSH expertise (applied to social innovation), in order to produce meaningful and significant effects enhancing the societal impact of the related research activities.

**HORIZON-CL5-2025-02-D3-04: Development of hydropower technologies and water management schemes allowing for win-win situation of flexible hydropower and biodiversity improvement – Societal Readiness Pilot**

<b>Call: Cluster 5 Call 02-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU</i>	The Commission estimates that an EU contribution of around EUR

<i>contribution per project</i>	4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 12.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Admissibility conditions</i>	<p>The conditions are described in General Annex A. The following exceptions apply:</p> <p>The page limit is extended by two pages to 47.</p>
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 4-5 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>103</sup></p>

**Expected Outcome:** For a renewables-based electricity system sufficiently flexible and also in the long-run highly sustainable hydropower capacity is pivotal.

Project results are expected to contribute to some of the following expected outcomes, to the benefit of hydropower operators and technology providers:

- Enhanced capacity of the hydropower fleet to contribute with renewables base load and management of water flows to a flexible energy system;
- Increased technology leadership, competitiveness, and technology export potential of the European hydropower industry;
- Enhanced sustainability of hydropower with positive effects on river ecosystems and biodiversity;
- Responsiveness to a deeper understanding of the needs and concerns of diverse social groups, citizens and civil society at large involved in or potentially affected by the R&I development, thereby increasing the potential for beneficial societal uptake and building trust in results and outcomes.

<sup>103</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

**Scope:** Proposals are expected to develop hydropower technology solutions or improved water management schemes or a combination of both, which allow for synergies between flexible hydropower energy generation and local ecosystem management for existing run-of-river hydropower or reservoir hydropower plants or cascades of such plants. To achieve this objective, e.g., hydropeaking, floodplain biotopes, sediment transport and/or river morphology restoration and environmentally efficient water flows also considering effects of climate change, can be addressed. Societal needs and the participation of local communities in decision processes in view of trust building should be considered.

Developed solutions are expected to enhance the flexibility of hydropower generation according to current and expected power grid needs and water availability, while being highly sustainable and creating positive impacts on river ecosystems and biodiversity, through e.g., equipment, material and digital innovation, nature-inclusive design, ecosystem restoration solutions, innovative and sustainable reservoir and water flow operation and management. Developed solution should not reduce the hydropower generation efficiency and equipment functionality while improving the environmental performances arising from this in a win-win optimisation and respective impacts for both, energy and biodiversity should be assessed. Pumped storage hydropower as well as water management schemes not related to hydropower are excluded from this topic.

This topic is a Societal-Readiness pilot:

- Proposals must follow the specific requirements applying to the Societal readiness pilot, as described in the introduction of the Horizon Europe Main Work Programme 2025 for Climate, Energy and Mobility. They entail the use of an interdisciplinary approach to deepening consideration and responsiveness of research and innovation activities to societal needs and concerns.
- This topic requires effective contribution of the relevant SSH expertise, including the involvement of SSH experts in the consortium, to meaningfully support Societal Readiness. Specifically, SSH expertise is expected to facilitate the socio-technological interface and enable the design of project objectives with Societal Readiness related activities.

**HORIZON-CL5-2026-02-D3-05: Demonstration of thermal energy storage solutions for solar thermal plants and systems**

<b>Call: Cluster 5 Call 02-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 7.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

<i>Indicative budget</i>	The total indicative budget for the topic is EUR 15.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 6 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Procedure</i>	<p>The procedure is described in General Annex F. The following exceptions apply:</p> <p>To ensure a balanced portfolio, grants will be awarded to proposals not only in order of ranking but at least also to one proposal that is the highest ranked within the area of concentrated solar power (CSP) and at least also to one proposal that is the highest ranked within the area of solar thermal heat and/or cold, provided that proposals attain all thresholds (and subject to available budget). This condition to ensure a balanced portfolio will also be considered to be met if a proposal addressing both areas is funded.</p>

**Expected Outcome:** Project results are expected to contribute to some of the following expected outcomes:

- Technology providers profit from successful demonstration and de-risking of thermal energy storage solutions that improve the dispatchability of solar thermal plants and/or systems;
- Technology providers have improved access to financing through better understanding of the bankability of dispatchable solar thermal solutions;
- Electricity grid operators have access to reliable options to cope with the increase in the share of variable-output renewables and reduce curtailments;
- The execution of the solar thermal implementation plan of the Strategic Energy Technology Plan (SET Plan) is supported and facilitated;
- The execution of the solar energy joint research and innovation agenda<sup>104</sup> is supported and facilitated.

**Scope:** Support will be given to the demonstration of innovative thermal energy storage solutions in the following areas: (i) concentrated solar power (CSP) and/or (ii) solar thermal heat and/or cold.

The proposed solutions will have to achieve substantial improvements in terms of performance, cost-effectiveness and life span compared to the current state of the art.

<sup>104</sup>

[https://research-and-innovation.ec.europa.eu/document/download/3acfa717-b321-4f7d-b8c3-765f507d7de2\\_en?filename=ec\\_rtd\\_swd-2024-160-f1.pdf](https://research-and-innovation.ec.europa.eu/document/download/3acfa717-b321-4f7d-b8c3-765f507d7de2_en?filename=ec_rtd_swd-2024-160-f1.pdf)

The project must include a clear go/no-go milestone ahead of entering the demonstration phase. Before this go/no-go milestone, the project must deliver the detailed engineering plans, a techno-economic assessment, and all needed permits for the demonstrator. The project proposal is expected to present a clear and convincing pathway and timeline to obtaining the permits.

The project has to assess the sustainability of the proposed solutions in environmental and socio-economic terms. Furthermore, the Commission initiative for Safe and Sustainable by Design<sup>105</sup> (SSbD) sets a framework for assessing the safety and sustainability of chemicals and materials which should be considered as a reference for project proposals.

Where applicable, the demonstration is expected to cover a continuous interval of at least six months covering all possible incidence angles of the direct solar radiation.

Plans for the exploitation and dissemination of results for proposals submitted under this topic are expected to include a strong business case and sound exploitation strategy. The exploitation plans are expected to include preliminary plans for scalability, commercialisation, and deployment (feasibility study, business plan) indicating the possible funding sources to be potentially used (in particular the Innovation Fund).

#### **HORIZON-CL5-2025-02-D3-06: Innovative manufacturing of wind energy technologies**

<b>Call: Cluster 5 Call 02-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 7.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 21.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the</p>

<sup>105</sup>

[https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/key-enabling-technologies/chemicals-and-advanced-materials\\_en](https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/key-enabling-technologies/chemicals-and-advanced-materials_en)

	Research and Training Programme of the European Atomic Energy Community (2021-2025). <sup>106</sup> .
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**Expected Outcome:** Project results are expected to contribute to some of the following expected outcomes:

- Energy consumers have access to affordable, clean, and secure energy with lower environmental impacts along the entire value chain;
- The European wind energy supply chain strengthens its strategic autonomy, technology leadership, competitiveness, and technology export potential;
- The deployment of wind energy in Europe is facilitated thanks to innovations enabling large-volume manufacturing therefore contributing to the achievement of the Net Zero Industry Act.

**Scope:** Proposals are expected to address some of the following aspects:

- Develop and demonstrate innovative wind energy manufacturing technologies that improve the health and safety working conditions of staff along the supply chain;
- Develop and demonstrate innovative wind energy manufacturing technologies that allow for reduced energy and material consumption, increased circularity, lower costs and decreased pollution;
- Develop and demonstrate automated and/or semi-automated manufacturing solutions that ensure high-quality products, high productivity, increase the lifetime and the reliability of wind energy systems;
- Develop and demonstrate manufacturing solutions for wind energy technologies that allow for high production throughput, optimisation of logistics and transport of components and reduced impacts on the environment, cultural heritage, landscapes and people.

The project could, for instance, support the development of innovative manufacturing solutions for onshore and/or offshore wind energy production, including airborne wind energy. It could focus on specific components of a wind energy system (e.g., blades, nacelles and towers, gearboxes, foundations, generators, floaters, mooring systems, anchors, kites, etc.).

The project should analyse and report on the potential for standardisation of the solutions developed, as well as on possible connections with ongoing standardisation efforts.

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<sup>106</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

The project must include a clear go/no-go milestone ahead of entering the demonstration phase. Before this go/no-go milestone, the project must deliver the detailed engineering plans, a techno-economic assessment, and all needed permits for the demonstrator. The project proposal is expected to present a clear and convincing pathway and timeline to obtaining the permits.

The project must assess the sustainability of the proposed solutions in environmental and socio-economic terms.

The demonstration must be at a realistic, representative scale and must cover a continuous interval of at least six months.

When developing improvements along the supply chain to improve the health and safety working conditions, projects must give special consideration to the gender dimension.

Proposals will present a plan for the exploitation and dissemination of results which should include a strong business case and sound exploitation strategy. The exploitation plan should include preliminary plans for scalability, commercialisation, and deployment (feasibility study, business plan) indicating the possible funding sources to be potentially used (in particular the Innovation Fund).

**HORIZON-CL5-2026-02-D3-07: Improved reliability and optimised operations and maintenance for wind energy systems**

<b>Call: Cluster 5 Call 02-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 15.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 4-5 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy</p>

Community (2021-2025).<sup>107</sup>

Expected Outcome: Project results are expected to contribute to all of the following expected outcomes:

- Limit the risks related to wind energy systems (e.g., operational, financial, climate) and thus reduce the wind energy projects' uncertainties;
- The European wind energy supply chain strengthens its strategic autonomy, technology leadership, competitiveness, and technology export potential.

Scope: Proposals are expected to address some of the following aspects:

- Develop and validate solutions to increase the reliability of wind energy systems and their components, thus ensuring security of supply and further reducing the environmental impacts;
- Develop new methods, computational techniques and tools to analyse and predict the reliability of wind energy systems, considering the analysis of the failure modes of existing systems and including a focus on new analytical approaches, technologies and materials;
- Develop new methods and tools for condition and health monitoring of wind energy systems and their components;
- Develop and validate solutions to optimise the operation and maintenance of wind energy systems and their components, for example through improved scheduling and predictive maintenance, autonomous tools, robots and vehicles, semi-automated inspection methods or advanced repair methods;
- Develop and validate new components to be incorporated in structures' designs to improve the safety and efficiency on-site during maintenance activities in wind farms;
- Develop innovative digital tools to facilitate wind farm operation and maintenance, for instance through improved interoperability, decision-making support tools, condition and health monitoring techniques and innovative sensors, while ensuring increased cybersecurity and data sharing.

The solutions proposed have to provide solid evidence to support the choice of the sub-systems and components in focus. They have to be most critical for the overall reliability of the wind energy systems. For instance, in the case of floating offshore wind, these could be dynamic cables, moorings and connection systems (electrical and mechanical) and their interaction with complex ocean flows.

<sup>107</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

Particular efforts should be made to ensure that the data produced in the context of this topic is FAIR (Findable, Accessible, Interoperable and Re-usable).

Digitalisation plays a prominent role under various perspectives, for instance in terms of improved predictive maintenance activities and advanced sensors technologies for diagnostics, condition and health monitoring of the power electronics, and structural health assessment and monitoring.

Projects should aim at reducing downtime and operational costs, enhancing safety protocols for maintenance crews, and increasing the overall lifespan and efficiency of wind energy assets. Integration of artificial intelligence and machine learning for real-time data analysis and decision-making processes can also be explored to further enhance operational efficiencies and predict potential failures before they occur.

These solutions should be easily standardised and/or should take into account current standardisation efforts, notwithstanding the TRL level envisaged for the projects developed under this topic.

**HORIZON-CL5-2026-02-D3-08: Understand and minimise the environmental impacts of offshore wind energy**

<b>Call: Cluster 5 Call 02-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 15.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Procedure</i>	<p>The procedure is described in General Annex F. The following exceptions apply:</p> <p>To ensure a balanced portfolio covering multiple geographical areas, grants will be awarded to applications not only in order of ranking, but priority will be given to high-ranking proposals that ensure, collectively, the best coverage of the different European sea basins (Atlantic Ocean, Baltic Sea, Black Sea, North Sea and Mediterranean Sea), provided that the proposals attain all thresholds.</p>
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions</p>

	under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). <sup>108</sup> .
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**Expected Outcome:** The EU's Offshore Strategy<sup>109</sup> underlines that the deployment of offshore wind should be based on maritime spatial planning, assessing the economic, social, and environmental sustainability of the installations in a life-cycle perspective, while ensuring co-existence with other activities such as commercial and recreational uses of the sea and fishing. At the same time, it calls for research on the cumulative impacts of offshore energy generation on the environment, which was also underlined in the Communication on Delivering on the EU offshore renewable energy ambitions (2023)<sup>110</sup>.

Our knowledge on such impacts, positive and negative, is more advanced now than when the Offshore Strategy was adopted<sup>111</sup>. However, there are still significant data and knowledge gaps. Most fieldwork studies have been carried out at very localised sites, and often focused on specific species. These ad-hoc studies lead to conclusions that can hardly be generalised. A sound monitoring, measuring multiple pressures and impacts on ecosystems and their services, at wider scale and also in interaction with other sea activities, is still largely missing. There is also a need to further develop models and other instruments for environmental risk assessment, identification of mitigation measures and recommendations for restoration measures, considering impacts during construction, operation and maintenance, and decommissioning.

Improving instruments, data, and knowledge on the cumulative environmental impacts of offshore energy, as well as a sound monitoring, is key to ensure that its expected fast and large-scale deployment will be sustainable. It will also better equip the EU to contribute to mitigate such impacts and promote sustainable deployment of offshore wind at regional (e.g., through OSPAR<sup>112</sup> in the Northeast Atlantic) or subregional (e.g., through the Greater North Sea basin Initiative) level.

Project results are expected to contribute to some of the following expected outcomes:

- The scientific community, public authorities, project designers, permitting authorities, civil society organisations and citizens have better tools (including Maritime Spatial Planning tools), reliable data and knowledge to monitor, assess and minimise the cumulative environmental, including on biodiversity, and socio-ecological impacts of

<sup>108</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

<sup>109</sup> COM(2020) 741 final

<sup>110</sup> [COM \(2023\) 668 final - EUR-Lex - 52023DC0668 - EN - EUR-Lex \(europa.eu\)](#)

<sup>111</sup> See for instance the ETC/ICM Report 2/2022: Mapping potential environmental impacts of offshore renewable energy, at: <https://www.eionet.europa.eu/etc/etc-icm/products/etc-icm-reports/etc-icm-report-2-2022-mapping-potential-environmental-impacts-of-offshore-renewable-energy>

<sup>112</sup> <https://www.ospar.org/>

large-scale bottom-fixed and floating offshore wind energy generation, including at sea-basin level and when combined with other planned or existing human activities;

- The monitoring of cumulative environmental impacts, including on biodiversity, of offshore wind installations is improved, with better tools and open data, in a coherent scheme with pre-existing monitoring programs of the marine environment at large scale;
- Ambitious national and regional offshore wind deployment targets are achieved with positive or minimum negative impacts on the marine and coastal environment;

Deploy offshore wind energy with minimal impact on marine and coastal ecosystems, and, if possible, with net-positive ones.

Scope: Proposals are expected to address one or some of the following aspects:

- Provide better knowledge and understanding of the cumulative environmental impacts of the offshore wind energy deployment according to the EU targets, when added to the current and planned human activities carried out in the same areas;
- Expand existing studies, field monitoring, and analysis from local to larger areas, and from site- or species-specific impacts to more general ones. Further develop and deploy field monitoring activities, measuring multiple pressures and impacts on marine and coastal ecosystems and their services, as well as pollution, from installation to decommissioning and possible repowering, including operational phase and maintenance activities;
- Test and demonstrate field monitoring and modelling technologies that allow to go beyond state-of-knowledge, regarding life-cycle environmental impacts of offshore wind energy deployments;
- Improve instruments and models for Maritime Spatial Planning, and environmental assessments at plan and project level that are in alignment with public authorities' needs;
- Improve modelling capacity and environmental impact assessments of future offshore wind deployment;
- Support the identification of areas where wind energy deployment is particularly suitable without significant environmental impact and areas where on the contrary, it should be avoided;
- Identify strategies, test and demonstrate technologies that avoid, minimise, mitigate and compensate the environmental impact of bottom-fixed and floating offshore wind energy systems, propose mitigation and restoration measures and if feasible, provide net-positive environmental impacts. The activities carried out under this point are expected to achieve TRL 5 by the end of the project.

Particular attention must be dedicated to ensuring that the data produced in the context of this topic is FAIR (Findable, Accessible, Interoperable and Re-usable) and to leveraging existing

community practices for data sharing especially those in the relevant European common data spaces and in the European Research infrastructures.

Complementarities with other ongoing and upcoming Horizon Europe projects are expected to be ensured as well as with the [European Digital Twin of Ocean \(European DTO\)](#) and its [core infrastructure](#), for instance the projects funded under topics:

- HORIZON-CL6-2025-02-CLIMATE-02: The ocean-climate-biodiversity-people nexus: uncovering safe operating space for safeguarding the integrity and health of the global ocean;
- HORIZON-MISS-2023-OCEAN-01-06 “Innovative nature-inclusive concepts to reconcile offshore renewables with ocean protection”;
- HORIZON-MISS-2023-OCEAN-01-08, ‘Integration of socio-ecological models into the Digital Twin Ocean’;
- HORIZON-CL5-2024-D3-02-08 “Minimisation of environmental, and optimisation of socio-economic impacts in the deployment, operation and decommissioning of offshore wind farms”.

In addition to considering the most evident environmental impacts of offshore wind energy systems (displacement, collision risk, exposure to noise, habitat loss and degradation, pollution, etc.), funded projects must include an analysis of possible new impacts, that may become particularly relevant when a high number of wind energy systems is deployed, for instance in relation to the decommissioning and removal of end-of-life offshore wind energy systems, the presence of dynamic cables suspended in the water column, the impact of submarine geohazards on the dynamic cables or the production of microplastics.

Environmental monitoring data must be open source and be shared with the European Marine Observation and Data Network (EMODnet) and the International Energy Agency Wind Energy Systems Technology Collaboration Programme’s (IEA Wind TCP) Task on the environmental effects of wind energy.

**HORIZON-CL5-2025-02-D3-09: Optimised/Alternative Silicon Growth Technologies (from either liquid or gaseous phase) for PV Applications (EUPI-PV Partnership)**

<b>Call: Cluster 5 Call 02-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 9.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 18.00 million.

<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>113</sup>.</p>

**Expected Outcome:** The majority of commercially available photovoltaic (PV) solar cells produced worldwide are made of crystalline silicon. Material quality, process technologies, and solar cell architectures have improved significantly in recent decades, and solar cell efficiencies are now approaching 27%, thus close to the theoretical limit. However, challenges remain in several aspects, such as increasing the production yield, stability, reliability, cost, and sustainability.

The ingot and wafering production steps are power intensive and produce recyclable waste in the form of kerf slurry – the residue ingot material from between the sliced wafers. These production steps are highly concentrated in China.

Project results are expected to contribute to all of the following expected outcomes:

- A European economic base which is stronger, more resilient, competitive, and fit for the green and digital transitions, by reducing environmental impact and strategic dependencies for critical raw materials and components;
- Scaling-up solar PV manufacturing capacity in Europe for an accelerated solar PV deployment, supporting Europe's decarbonisation targets;
- Reduced energy and material consumption and lower carbon and environmental footprint for crystalline silicon PV products along their lifecycle;
- The execution of the solar energy joint research and innovation agenda<sup>114</sup>.

**Scope:** Due to their efficiency and durability, crystalline silicon wafers are by far the most common absorber material used in the production of solar cells and modules today. These

<sup>113</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

<sup>114</sup> [Commission Staff Working Document "Solar energy joint research and innovation agenda with Member States in the context of the European Research Area \(ERA\)"](#)

wafers are primarily made using either a directional solidification that produces large-grained multi-crystalline (mc-Si) wafers with a greater defect density (and therefore almost out of production) or a solar-optimised Czochralski (Cz) growing method that produces crystalline silicon with low defect density (c-Si). In addition, “kerfless” silicon wafers can be grown directly either from molten silicon or from gaseous epitaxial deposition on a low-cost substrate at high temperature. To facilitate continued and rapid proliferation of Si photovoltaics, realizing new, more efficient and less energy and material intensive processes for silicon feedstock, ingots and wafers is sought. Therefore, proposals are expected to address at least one of the following challenges:

- Demonstrate alternative, efficient, and scalable (towards gigawatt capacity) processes or methods and equipment to grow silicon ingots and wafers from either liquid or gaseous phase at lower cost (with lower energy and material requirements) and high-quality compared to standard processes and possibly avoid the wafering step;
- Optimise standard processes and equipment for defect, impurities and structure loss minimisation, high-quality ingots with large diameters (for larger wafers) that allow for higher level of automation and kerf recycling and reduced energy use; optimise wafering.

Proposals are expected to involve multidisciplinary consortia including at least one silicon ingot and wafer manufacturer.

Proposals will present a plan for the exploitation and dissemination of results which should include a strong business case and sound exploitation strategy. The exploitation plan should include preliminary plans for scalability, commercialisation, and deployment (feasibility study, business plan) indicating the possible funding sources to be potentially used (in particular the Innovation Fund).

This topic implements the co-programmed European Partnership for Innovation in Photovoltaics (EUPI-PV). As such, projects resulting from this topic will be expected to report on the results to the European Partnership for Innovation in Photovoltaics (EUPI-PV) in support of the monitoring of its KPIs.

#### **HORIZON-CL5-2026-02-D3-10: Towards commercialisation of Perovskite PV and development of dedicated manufacturing equipment (EUPI-PV Partnership)**

<b>Call: Cluster 5 Call 02-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 9.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

<i>Indicative budget</i>	The total indicative budget for the topic is EUR 18.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.

**Expected Outcome:** The rapid development of perovskite solar cells (PSCs) over the past decade makes it the most promising next generation photovoltaic technology, owing to its prominent advantages such as tuneable bandgap, high absorption coefficients, uncomplicated preparation process and considerable power conversion efficiency which has reached a certified 26.7% at cell level. Tremendous efforts in material and device engineering have also increased moisture, heat, and light-related stability. All these features render perovskite solar modules suitable for terawatt-scale energy production with a low levelised cost of electricity (LCOE). A number of companies are working on PSCs and some of them, have been establishing new pilot production lines and/or expanding production capacity. Still, the greatest challenges toward commercialisation are scaling up (including ambient manufacturing), achieving long-term stability, reducing, or eliminating the use of toxic solvents, and preventing Pb leakage into the environment.

Project results are expected to contribute to all of the following expected outcomes:

- Increase the potential for commercialisation of perovskite PV creating competitive technological know-how for the European PV industrial base;
- Support a 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 and components;
- Support the execution of the solar energy joint research and innovation agenda<sup>115</sup>.

**Scope:** Metal halide perovskite solar cells have attracted much attention because of their low-cost fabrication and high efficiency. In addition, tandem devices, especially perovskite-Si tandems, are expected to play an important role in perovskite commercialisation. Poor stability of these devices remains however the key challenge in their path toward commercialisation. To overcome this issue, a robust encapsulation technique by employing suitable materials and structures with high barrier performance against the external environment must be developed to protect perovskite devices. Dedicated manufacturing processes and equipment need also be demonstrated. Therefore, proposals are expected to address all of the following aspects:

- Demonstrate effective strategies to enhance the optoelectronic properties, performance and stability, and minimise the environmental impact of perovskite devices;

<sup>115</sup> [Commission Staff Working Document "Solar energy joint research and innovation agenda with Member States in the context of the European Research Area \(ERA\)"](#)

- Scale-up reliable deposition of high-quality perovskite films over large areas, (overcoming the degradation of efficiency as device/module areas scale up) but also patterning and interconnections to connect individual cells into modules;
- Demonstrate internal and external encapsulation structures as protection from extrinsic environmental stressors, such as moisture, oxygen, heat, and illumination;
- Develop module designs considering recyclability requirements and restrictions as to the control and management of toxic Pb<sup>2+</sup> that could be produced by the irreversible deterioration of the perovskite materials;
- Assess performance and reliability according to international standards and compared with well-established PV technologies;
- Demonstrate suitable equipment adapted to the specific requirements of perovskite (or perovskite-Si tandem) production process.

Proposals are expected to involve multidisciplinary consortia including at least one perovskite or equipment manufacturer.

Proposals will present a plan for the exploitation and dissemination of results which should include a strong business case and sound exploitation strategy. The exploitation plan should include preliminary plans for scalability, commercialisation, and deployment (feasibility study, business plan) indicating the possible funding sources to be potentially used (in particular the Innovation Fund).

This topic implements the co-programmed European Partnership for Innovation in Photovoltaics (EUPI-PV). As such, projects resulting from this topic will be expected to report on the results to the European Partnership for Innovation in Photovoltaics (EUPI-PV) in support of the monitoring of its KPIs.

**HORIZON-CL5-2025-02-D3-11: Novel inverter technologies and flexibility in PV systems (EUPI-PV Partnership)**

<b>Call: Cluster 5 Call 02-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 6.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 18.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology</i>	Activities are expected to achieve TRL 6-7 by the end of the project –

<i>Readiness Level</i>	see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>116</sup>.</p>

**Expected Outcome:** Integrating renewable and distributed energy resources, such as photovoltaics (PV) and energy storage devices, into the electric distribution system requires advanced power electronics, or smart inverters, that can provide grid services such as voltage and frequency regulation, ride-through capabilities, dynamic current injection, and anti-islanding functionality. To enable this integration, designing novel smart inverter technologies, developing robust control algorithms for better inverter functionality, determining interactions between multiple smart inverters and between inverters and utility distribution systems, supporting standards development for smart inverter functionalities, and analysing the impacts of smart inverters on distribution systems is necessary.

Project results are expected to contribute to all of the following expected outcomes:

- Energy yield improvement of PV systems based on smart digitalisation;
- Optimal utilisation of generated energy, energy savings, and enhanced overall energy efficiency;
- Enhanced flexibility services and interoperability;
- The execution of the solar energy joint research and innovation agenda<sup>117</sup>.

**Scope:** Proposals are expected to:

- Demonstrate new inverter technologies with increased power density and reliability at lower cost (e.g., allowing for medium voltage PV systems), that integrate new power device technologies based on wide bandgap semiconductors (e.g., GaN, SiC) that could supply synthetic inertia and a range of grid services;
- Design of smart (e.g., integrating condition and health monitoring), and with improved capabilities, inverter hardware and firmware;

<sup>116</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

<sup>117</sup> [Commission Staff Working Document "Solar energy joint research and innovation agenda with Member States in the context of the European Research Area \(ERA\)"](#)

- Use of control and power hardware-in-the-loop techniques to determine interactions between multiple inverters at multiple points of common coupling;
- Demonstrate integrated communication connection between inverters and other components (e.g., battery, PV modules, grid, etc.) to automatically gather their information (serial number, geolocalisation, etc.) and support the creation of Digital Twins and PV data models, towards a real predictive monitoring of electricity production;
- Evaluating system integration and cybersecurity, while providing guidance for future developments (e.g., recyclability) in both hardware and software.

This topic implements the co-programmed European Partnership for Innovation in Photovoltaics (EUPI-PV). As such, projects resulting from this topic will be expected to report on the results to the European Partnership for Innovation in Photovoltaics (EUPI-PV) in support of the monitoring of its KPIs.

**HORIZON-CL5-2026-02-D3-12: Extending the lifetime of crystalline silicon PV modules (EUPI-PV Partnership)**

<b>Call: Cluster 5 Call 02-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 8.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 4-5 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>118</sup></p>

<sup>118</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link:

**Expected Outcome:** Photovoltaic (PV) energy systems are one of the cheapest and fastest growing sources of electricity generation, largely thanks to an important decrease in the cost of solar modules in the last 10-15 years, and to their simple installation. The PV market is changing fast, recently transitioning to high-efficiency crystalline silicon cell concepts (e.g., Tunnel Oxide Passivated Contact (TOPCon), Heterojunction (HJT), Interdigitated Back Contact (IBC), tandem, etc.), larger modules or novel designs (e.g., bifacial), use of new materials (e.g., anti-reflection and anti-soiling coatings, thinner glass, new encapsulants and backsheets), or increased number and topology of busbars or wires. There is no PV lifetime definition, but manufacturers usually guarantee a 25-year lifetime with an expected degradation rate of 0.8% per year. However, abnormal degradation rates are still reported for cell and module technologies due to a variety of failures which reduce reliability and increase the cost of PV systems operation.

Project results are expected to contribute to all of the following expected outcomes:

- Reduced degradation to levels that enable longer PV module lifetimes;
- Increased module durability and reliability;
- Resource efficiency and lifelong energy yield improvement of PV systems;
- Decreased levelised cost of electricity (LCOE);
- Execution of the solar energy joint research and innovation agenda<sup>119</sup>.

**Scope:** The degradation rate might vary depending on many factors such as material properties, environmental stress (solar irradiance, humidity, temperature, wind speed, dust, etc.), installation, design and type of components and connections, with some components deteriorating on their own and others impacting additional PV components, leading to more severe failures. To tackle these issues and extend the lifetime of PV modules (and systems) proposals are expected to:

- Identify failure modes encountered in recently developed high-efficiency or novel design c-silicon modules themselves and their components, exploring their mechanisms and root causes, reviewing each component's susceptibility to failures and impacting additional PV components;
- Develop, where necessary, simple, cost-effective and accurate failure detection techniques, applicable to most PV systems;
- Propose mitigation approaches at module and system level and validate approaches through modelling and lab testing;

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<sup>119</sup> [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

Commission Staff Working Document "Solar energy joint research and innovation agenda with Member States in the context of the European Research Area (ERA)"

- Perform outdoor field experiments and testing to determine degradation rates and/or to identify failure modes.

Different locations representing the European range of climates are to be considered for field experiments.

This topic implements the co-programmed European Partnership for Innovation in Photovoltaics (EUPI-PV). As such, projects resulting from this topic will be expected to report on the results to the European Partnership for Innovation in Photovoltaics (EUPI-PV) in support of the monitoring of its KPIs.

**HORIZON-CL5-2026-02-D3-13: De-risking wave energy technology development through transnational pre-commercial procurement of Wave energy research and development**

<b>Call: Cluster 5 Call 02-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 20.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 20.00 million.
<i>Type of Action</i>	Pre-commercial Procurement

Expected Outcome: Project results are expected to contribute to all of the following expected outcomes:

- Energy producers and consumers benefit from improved efficiency and flexibility, reduced cost, improved reliability, robustness and security compared to existing wave energy technologies;
- Wave energy technology providers profit from accelerated technology development, successful demonstrations and de-risking of wave energy technologies with a view to their commercial exploitation;
- Wave energy technology providers have improved access to financing through better understanding of technological solutions and their bankability, leading to effective market uptake, business models, and commercialisation avenues;
- Researchers, industry, public authorities, and citizens have access to increased knowledge, monitoring and assessment methods and tools on the environmental, biodiversity, and socio-economic (both positive and negative) impacts of the wave energy technologies along their lifecycle and value chains;

- Wave energy technology providers have detailed analysis of current costs and potential future energy cost reduction pathways and the creation of a detailed business plan for full scale commercialisation resulting in a clear path for commercial roll-out of the successful wave energy design(s) beyond the lifetime of the project;
- Funding authorities pool resources at national and EU levels dedicated to Research and Development and provide effectively a significant developmental boost of wave energy technology.

**Scope:** The challenge is the development and demonstration of cost-effective wave energy converters that can survive in a harsh and unpredictable ocean or sea environment through demand-driven pre-commercial procurement (PCP). The challenge is open to proposals seeking to steer wave energy development in an effective way at a European level and to bring these technologies to the market.

The operation of wave energy prototypes in real sea conditions is a critical step to establish confidence in the devices and to facilitate the large-scale roll-out of this renewable technology. Pre-commercial procurement has been shown to be an effective tool to de-risk such activities.

The EuropeWave PCP action has introduced the ocean energy stage-gate process on a European-level procedure following the evaluation framework provided by Task 12 of the IEA Ocean Energy System Technology Collaboration Platform. It supported the development of several wave energy devices in a stage-gate process to Stage 3 (approximately TRL 6). The scope of this action is to bring wave energy technologies at Stage 4 approximately TRL7/8). Designs must achieve completion of Stage 4 activities of the IEA-OES Framework Evaluation Areas by the end of the action, including technical, socio-economic, and sustainability aspects.

The proposed action is to be structured as following:

**Preparation phase:**

Participating users/buyers of R&D services (with either a pan-European, national, or regional focus) should agree on a common set of performance levels and associated specifications for wave energy systems. Demonstrators don't have to be necessarily tested at the same site.

The funding from the participating users/buyers and the European Union will be used to bring forward wave energy technologies and complete Stage 4 (reach TRL7/8).

The procurement is open to entities established in the EU and/or countries associated to Horizon Europe.

The procurement is open to developers which completed Stage 3 (with or without the support of EuropeWave). All developers should provide evidence that they have completed Stage 3. A phased approach can be considered to allow developers to qualify for selection for the Stage 4 demonstration.

This will lead to one or more calls for tender (for the procurement of R&D services) that will focus on clearly identified technologies contributing to the development of commercial wave energy devices.

At the end of the preparation phase, the following results are expected: i) completed tender documents, ii) signed joint procurement agreement confirming the collaboration modus operandi including the financial commitment of the buyers' group and iii) final confirmation of the lead procurer.

**Execution phase:**

This phase will take care of implementing the PCP and its contracts.

The procurement will be executed as a single joint procedure. The research and specification works are expected to lead to at least two full scale demonstrators tested for at least 12 months in an industrially relevant environment during the action duration following the IEA-OES<sup>120</sup> stage-gate metrics.

Results will be shared with the European industry to accelerate the technology development and the establishment of guidelines and standards to facilitate the transferability of knowledge creation. At the end of the action, at least one of the demonstrators is expected to be ready for testing in an operational environment at commercial scale.

Proposals have to describe their jointly identified challenge, indicating how it fits into their mid-to-long term innovation plans, and specify why solutions currently available on the market or under development are not meeting their needs.

Activities have to include: (1) networking related to preparation, management and coordination and (2) joint research activities related to the validation of PCP strategy. The consortium should include at least three legal entities established in different member states or Horizon Europe associated countries, as well as a minimum of two 'public procurers'. Other entities with a clear added value in the preparation and/or execution of the PCP or in coordination and networking activities might be considered.

At the end of the action, designs are expected to be ready to proceed to Stage 5 activities of the IEA-OES Framework Evaluation Areas (Commercial-scale array demonstration).

**HORIZON-CL5-2026-02-D3-14: Development of innovative solutions strengthening the security of renewable energy value chains**

<b>Call: Cluster 5 Call 02-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per</i>	The Commission estimates that an EU contribution of around EUR 2.00 million would allow these outcomes to be addressed appropriately.

<sup>120</sup>

IEA-OES: International Energy Agency – Ocean Energy Systems

<i>project</i>	Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 6.00 million.
<i>Type of Action</i>	Coordination and Support Actions
<i>Procedure</i>	<p>The procedure is described in General Annex F. The following exceptions apply:</p> <p>Proposals are expected to clearly address only one of the following areas:</p> <ol style="list-style-type: none"> <li>1. “Sustainability and social awareness of specific renewable energy value chains as a limiting factor for their roll-out and performance over time”; or</li> <li>2. “Skills for renewable energy value chains as a limiting factor for innovation and deployment of relevant clean energy technologies”; or</li> <li>3. “Complexity for specific renewable energy value chains”.</li> </ol> <p>To ensure a balanced portfolio covering areas 1., 2. and 3., grants will be awarded to applications not only in order of ranking but at least also to one project that is the highest ranked within area 1., 2. or 3., provided that the applications attain all thresholds. This will allow to fund at least one project under area 1., 2. and 3. respectively.</p>
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>121</sup></p>

**Expected Outcome:** The security of Europe's clean energy system will, in the long-run, benefit from research and innovation addressing energy-security relevant criticalities of the underlying clean energy technology value chains.

Project results are expected to contribute to some of the following expected outcomes, from which all actors of European clean energy value chains can benefit:

<sup>121</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/lst-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/lst-decision_he_en.pdf)

- Strengthened European knowledge base, skills, research and industrial leadership on solutions for energy-security related aspects of renewable energy value chains;
- Technical and value chain solutions are developed addressing key aspects improving the energy security of renewable energy technologies;
- Strengthened availability of skilled labour (crafts, science and business) in order to increase the intra-European share of entire value chains;
- Improved competitiveness, sustainability, and resilience of European renewable energy value chains.

**Scope:** Proposals are expected to provide in-depth assessments that will lead to novel solutions improving critical aspects of specific renewable energy technologies and their respective value chains impacting EU's energy security.

Proposals are expected to focus on the development of solutions for these critical aspects, which could highly improve the overall capacity of the specific value chain in contributing to an improved energy security for Europe in the long run. The projects must address precisely only one of the following areas:

- Sustainability and social awareness of specific renewable energy value chains as a limiting factor for their roll-out and performance over time (this is expected to be addressed either for hydropower or bioenergy);
- Skills for renewable energy value chains as a limiting factor for innovation and deployment of relevant clean energy technologies;
- Complexity for specific renewable energy value chains (this is expected to be addressed either for grid based RFNBOs or direct solar fuels).

Applicants must explicitly indicate to which of these three areas they apply.

Proposals are expected to build on the results of the *Study on clean energy R&I opportunities to ensure European energy security by targeting challenges of distinct energy value chains for 2030 and beyond*<sup>122</sup>.

**HORIZON-CL5-2025-02-D3-15: Building a Long-Term Africa Union (AU) and European Union (EU) Research and Innovation joint collaboration on Sustainable Renewable Energies**

**Call: Cluster 5 Call 02-2025 (WP 2025)**

<sup>122</sup> European Commission, Directorate-General for Research and Innovation, Schleker, T., Hicks, M., Cressida Howard, I. et al., *Study on clean energy R&I opportunities to ensure European energy security by targeting challenges of distinct energy value chains for 2030 and beyond final report*, Schleker, T.(editor), Publications Office of the European Union, 2024, <https://data.europa.eu/doi/10.2777/906828>

<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 4.00 million.
<i>Type of Action</i>	Coordination and Support Actions
<i>Eligibility conditions</i>	<p>The conditions are described in General Annex B. The following exceptions apply:</p> <p>In addition to the standard eligibility criteria, at least 40% of the beneficiaries must be established in African Union member states.</p> <p>Due to the scope of this topic, legal entities established in all member states of the African Union (AU) are exceptionally eligible for EU funding.</p>
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>123</sup></p>

**Expected Outcome:** The EU intends to play an increasingly leading role in global and multilateral initiatives. The EU is developing further the AU-EU Research and Innovation Partnership on Climate Change and Sustainable Energy, emanating from the AU-EU High-level Policy Dialogue ('Africa initiative'), to implement the AU-EU Innovation Agenda<sup>124</sup> adopted in July 2023. The Green Deal underlines that "Renewable energy and energy efficiency, for example for clean cooking, are key to closing the energy access gap in Africa while delivering the required reduction in CO<sub>2</sub>".

Project results are expected to contribute to all of the following expected outcomes:

<sup>123</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

<sup>124</sup> One of the flagship initiatives of the Global Gateway, which will in particular support the implementation of short-, mid- and long-term actions in the area of green transition related to climate change.

- R&I communities of researchers, industries, funding organisations and policy makers will count on a lasting AU-EU sustainable R&I partnership framework to implement joint R&I programmes of activities;
- Researchers, industry, public authorities, and citizens have access to increased knowledge, assessment methods, tools and expertise network;
- The joint AU-EU Climate Change and Sustainable Energy Collaborative Partnership and EU Science Diplomacy in Africa will be strengthened.

**Scope:** The proposal will build on the achievements made under the project LEAP-RE to strengthen and establish a sustainable collaboration framework. The proposal will expand and provide support to the established community of researchers, industries, innovators and funding organisations involved in the partnership, and seek to create links to other relevant R&I communities. Activities will contribute to human and institutional capacity-building and turn the AU-EU Research and Innovation Partnership on Climate Change and Sustainable Energy into a long-term platform for collaboration.

The activities to be covered are:

- Support the implementation of the AU-EU Innovation Agenda priority on Green Transition and the Global Gateway in Sub-Saharan Africa to increase investments in energy access;
- Analyse the impact of relevant EU-Africa research and innovation projects funded by the EU in the sustainable energy domain;
- Accelerate the translation of innovation into real-life outputs;
- Engagement of local communities across the African continent, in view of facilitating co-design, hybridisation and accelerated adoption of innovation; social sciences and humanities – including gender studies – is expected to play a key role;
- Develop human and institutional capacities on innovative sustainable energy through the creation of a sustainable network of experts and of science-based policymaking knowledge in synergy with existing activities of other AU and EU initiatives;
- Implement and push further clustering activities with all relevant on-going EU, national and regional funded projects, to enable stronger cross-projects co-operation, consultations and joint activities on cross-cutting issues;
- Provide support to the AU-EU Climate Change and Sustainable Energy Partnership of the AU-EU High Level Policy Dialogue on Science, Technology and Innovation, and other AU-EU policy agendas;
- Update strategic and joint research and innovation action roadmaps, implemented and defined in the project LEAP-RE ([www.leap-re.eu](http://www.leap-re.eu)) to the new ambitions for 2030 and 2050.

Proposals are to provide a long-term perspective and vision on how the AU-EU Research and Innovation joint collaboration on Sustainable Renewable Energies will be supported both financially and structurally, after the end of the project. Proposals should include activities to further develop this long-term perspective and vision, and how to implement it. Synergy and complementarity with projects selected under topics *HORIZON-CL5-2024-D3-01-09: Africa-EU CO-FUND action* and *HORIZON-CL5-2025-03-D1-07: Implementing the climate action pillar of the EU-African Union Partnership on Climate Change and Sustainable Energy* will need to be ensured.

### **Energy systems, grids & storage**

Proposals are invited against the following topic(s):

#### **HORIZON-CL5-2025-02-D3-16: Support to the BRIDGE initiative**

<b>Call: Cluster 5 Call 02-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 1.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 1.00 million.
<i>Type of Action</i>	Coordination and Support Actions
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>125</sup></p>

**Expected Outcome:** The development of research and innovation policies, as well as general energy policies in the area of smart and integrated energy systems require a sound evidence base. The BRIDGE<sup>126</sup> initiative established by the European Commission brings together projects funded under the Horizon 2020 and Horizon Europe programmes in the areas of Smart Grids, Energy Storage, Islands, and Digitalisation. BRIDGE has a twofold objective.

<sup>125</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

<sup>126</sup> <https://bridge-smart-grid-storage-systems-digital-projects.ec.europa.eu/>

On the one hand, it fosters the exchange of information, experience, knowledge, and best practices among the projects. On the other hand, it provides field experience, feedback and lessons learned from the participating projects to help overcome the barriers to effective innovation. It aims at gathering coordinated, balanced and coherent recommendations presented with a single voice to policy makers, in view of successfully supporting research and innovation actions, and exploiting the results achieved by projects.

Project results are expected to contribute to all the following expected outcomes:

- European research and innovation policies, and energy policies in the areas of smart energy systems are supported by evidence gathered from the implementation of real-life projects.
- Projects funded under Horizon Europe that address energy systems are informed on solutions and methodologies that were previously developed by European-funded projects and are effectively benchmarking their results and compare lessons learnt with other similar European projects.
- Consolidation of the BRIDGE initiative and re-affirmation of its role as a recognised European reference for providing innovative solutions for the development of smart and integrated energy systems.
- Effective and improved cooperation of BRIDGE with other European initiatives that are active in related areas (such as ETIP SNET<sup>127</sup>).

Scope: Proposals are expected to:

- Provide professional support to the overall organisation of the BRIDGE initiative, its working groups and task forces. This includes organisational and logistical support for the governance of BRIDGE, e.g. for the preparation and execution of meetings and support to the activities of coordination with other EU and/or national initiatives and bodies. It also includes support to the chairs of the working group chairs in fulfilling their roles and facilitating the periodic processes for the renewal of the chairmanship.
- Onboard new projects and maintain the database of BRIDGE members in terms of projects, implementing organisations/project partners, their membership in Working Groups and Task Forces, contact details.
- Ensure the completion and publication of the relevant reports, studies, brochures, policy briefings etc. Three main categories of documents are envisaged:
  1. BRIDGE annual brochures<sup>128</sup> – are prepared by the project, updated annually and published online;

<sup>127</sup>

<https://smart-networks-energy-transition.ec.europa.eu/>

<sup>128</sup>

As an example, see the Bridge Brochure 2023 <https://bridge-smart-grid-storage-systems-digital-projects.ec.europa.eu/sites/default/files/download/bridge%20cooperation%20between%20horizon%202020%20and%20horizon-MJ0423748ENN.pdf>

2. Annual thematic/expert reports <sup>129</sup> containing policy conclusions and recommendations – are drafted by the BRIDGE working groups under the coordination of their chairmanship, as decided in their annual work programmes. The project ensures final editorial support and formatting, and their publication online;
3. Other reports, as needed and decided by the Bridge chairmanship on a case-by-case basis.

- Maintain the online presence of BRIDGE and ensure the related communication activities, notably through maintaining and developing its dedicated web page, distributing a periodic (online) newsletter, and posts on social media.
- Enable BRIDGE to provide policy support to the European Commission services (mainly to DG Energy) by gathering, structuring and presenting information on technological progress, innovation, competitiveness and digitalisation in the field of smart energy systems.
- Organise the annual BRIDGE General Assemblies, including invitations, hosting, minutes/conclusion drafting and follow up on action points. The meetings usually take place in March, usually face-to-face in Brussels with hybrid options available.
- Manage cooperation with other relevant European initiatives, notably with the European Technology and Innovation Platform - Smart Networks for Energy Transition (ETIP SNET). Manage the representation of BRIDGE and its member projects at key events (e.g., European Sustainable Energy Week, established European fairs such as Enlit – to be decided on a case-by-case basis etc.).

Proposals submitted under this topic are encouraged to include actions designed to facilitate cooperation, across Europe, with other initiatives and to ensure the accessibility and reusability of data produced during the project.

The indicative project duration is three years.

**HORIZON-CL5-2025-02-D3-17: Control and operation tools for a RES-based energy system**

<b>Call: Cluster 5 Call 02-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 10.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a

<sup>129</sup> See examples at <https://bridge-smart-grid-storage-systems-digital-projects.ec.europa.eu/news/10-new-reports-produced-bridge-working-groups-and-task-forces-now-available-download>

	proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 20.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B. Activities may start at any TRL.

**Expected Outcome:** Project results are expected to contribute to all the following expected outcomes:

- Improved preparedness of the electricity system to support the EU's binding target for 2030 of minimum 42.5% renewables in gross final energy consumption, with the aspiration to reach 45%;
- Grid operators employ improved tools for forecasting energy generation from renewable sources and energy demand;
- Grid operators employ innovative energy management systems and technologies for smart grids to operate efficiently the integration of RES at various voltage levels;
- Transmission and distribution system operators develop better capacity for exploiting system flexibility and accessing services for demand response and energy storage;
- System operators develop structured mechanisms to cooperate with energy suppliers and service providers when required by grid conditions;
- Transmission and distribution system operators cooperate and develop mechanisms to reduce system risks associated with increased fluctuating generation.

**Scope:** Projects will:

- Design and test innovative technologies, processes, and control mechanisms for the seamless integration of massive volumes of renewable energy sources (RES) at distribution and transmission levels. The solutions are expected to incorporate both hardware and software aspects;
- Address network constraints and increase flexibility capabilities of grids, through advanced operation and control mechanisms and tools, for improving the overall grid performance and the efficiency of RES uptake;
- Ensure effective coordination between transmission and distribution levels of the electricity grids, for the integration of massive volumes of RES at multiple voltage levels, maintaining grid stability and overall preparing for a RES-based energy system.

The demonstration, test and validation of the activities should be carried out in at least two pilots in different EU Member States and Associated Countries.

Proposals should demonstrate a clear understanding of the challenges and opportunities associated with integrating renewable energy sources into the existing energy system. Building on this, they should demonstrate a comprehensive approach for developing and testing advanced technologies and control mechanisms that can effectively address these challenges, while capitalising on solutions for digitalising the energy system.

In addition, projects should propose a set of best practices and recommendations on the effective uptake of increased shares of renewables. This should be suitable for a level of renewables in the electricity system that would allow reaching the EU's binding renewable target for 2030 of minimum of 42.5% (with the aspiration to reach 45%).

Projects are expected to include at least two electricity transmission system operators (TSOs) and four distribution system operators (DSOs), which could be distributed among the pilots of a particular project.

Additionally, collaboration is encouraged with the following entities:

- at least three suppliers of energy from renewable sources, out of which at least two should supply energy from non-dispatchable energy sources. The supply covered by the project should include both wind and solar energy sources;
- at least two providers of energy services for the grids (e.g., aggregation of energy supply and/or energy demand, energy storage).

Selected projects are expected to contribute to the BRIDGE initiative<sup>130</sup> and actively participate in its activities.

**HORIZON-CL5-2026-02-D3-18: Next generation distribution substation for increasing the system resilience**

<b>Call: Cluster 5 Call 02-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 9.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 18.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.

<sup>130</sup>

<https://bridge-smart-grid-storage-systems-digital-projects.ec.europa.eu/>

**Expected Outcome:** Project results are expected to contribute to all of the following expected outcomes:

- Improved observability, monitoring and control of the electricity distribution grids;
- Optimised management of the grids by system operators and improved system resilience (including withstanding natural hazards and cybersecurity incidents);
- Grid operators integrate in their practices real-time decision-making. These could be assisted by artificial intelligence (AI) algorithms, if applicable;
- A 'smart substation ecosystem' is created that includes distribution system operators, technology/solution providers, integrators, application developers etc. This should cover both high-to-medium and medium-to-low voltage levels.

**Scope:** Projects will:

- Demonstrate the integration of power electronics, intelligent electronic devices (IEDs), and software solutions in the distribution substations or in their proximity;
- Demonstrate real-time monitoring and analysis of grid conditions (including power quality, voltage levels, and system performance) that allow operators to quickly identify and address any potential issues or disturbances, help to prevent outages and minimise the impact of service disruptions;
- Consolidate data streams from otherwise dispersed sources to create unified visualisations and consolidated analytics that offer insights into the performance of distributions substations;
- Develop the concept of a flexible and programmable electricity distribution grid in which the substation is a centre of intelligence that facilitates optimal power routing while ensuring the resilience of the electricity grid.

The demonstration, test and validation of the activities should be carried out in at least two pilots in different EU Member States and/or Associated Countries.

The projects should propose a set of best practices and recommendations on effective overarching principles and operational measures for: (i) building smart distribution substations, and (ii) integrating them into a more resilient, intelligent, and responsive distribution grid which is able to tackle disturbances and address net congestion.

Projects are expected to include at least five distribution system operators (DSOs) operating across different geographies and climate conditions. This total number of DSOs per project could be distributed across the different pilots of a particular project.

Additionally, collaboration is encouraged with the following entities:

- at least two suppliers of technologies for smart power substations;

- at least one TSO.

The selected projects are expected to contribute to the BRIDGE initiative<sup>131</sup>, actively participate in its activities.

**HORIZON-CL5-2026-02-D3-19: Innovation solutions for a generative AI-powered digital spine of the EU energy system**

<b>Call: Cluster 5 Call 02-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 8.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 16.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.

**Expected Outcome:** Project results are expected to contribute to all of the following expected outcomes:

- Availability of generative Artificial Intelligence (AI) tools for electricity system operators, energy service providers, and households and energy communities to enhance digital and green transformation in energy, mobility, and buildings;
- Implementation of decentralised IT solutions based on generative AI to support local grid optimisation, thereby increasing the uptake of renewable energy sources, electric vehicles, and electrification of household and industrial demand at the distribution level;
- Increased reliability, resilience, security, and energy efficiency of the energy system through advanced AI and digital tools;
- Enhanced knowledge for modernising and operating energy networks, integrating digital services, renewables, and electrification through the use of cutting-edge AI technologies;
- Development of smarter demand-side tools for industries and consumers, leveraging AI to optimise energy production and consumption.

**Scope:** To achieve the Green Deal objectives for 2030 and 2050, substantial investments are required in a smart and digitally enabled energy system capable of integrating higher shares of renewable energy and electrification of demand and electricity storage. This encompasses

<sup>131</sup>

<https://bridge-smart-grid-storage-systems-digital-projects.ec.europa.eu/>

various sectors such as transport (notably electric vehicles), industry (heating and hydrogen production) and residential heating.

Effective smart planning, operation and control of the electricity grid and numerous distributed devices – including smart electricity meters, smart bi-directional charging networks for electric vehicles, and smart building platforms – are essential. These efforts must be underpinned by markets for flexibility and demand response, along with seamless data exchange between actors and devices.

On-going innovation in the energy data space, smart Internet of Things (IoT) solutions, and digital twins for energy systems, coupled with energy price and market considerations, provide the foundation for advanced energy system intelligence. This intelligence will be further enhanced by leveraging generative artificial intelligence and the emerging AI Factories.

The scope is to develop and pilot prototypes of a generative AI-powered digital spine that enhances the digitalisation and decarbonisation of the EU energy system.

The overall scope is the develop of a prototype of an automated, AI-powered, software-defined smart energy system leveraging and further developing existing (open-source) existing digital solutions of lower TRLs developed in EU and national research, innovation-and deployment-programmes, as well as AI algorithms and tools provided by the AI Factories, namely to:

- Develop and test the potential for generative AI to develop apps/programmes for local system optimisation and for system planning and operation;
- Develop and test generative AI that can identify sources of flexibility and provide solutions for interoperability and data exchange to enable decentralised optimisation of distributed assets. This includes the integration with various data sources and sectors, such as mobility, to promote decentralisation, energy-efficiency, and cost-efficiency and to enable interoperability across different parts of the energy system;
- Explore the potential of generative AI for system optimisation through scenario generation, simulation, and time series forecasting, while also developing optimisation tools for both supply-side and demand-side management using forecasts and data for renewable energy, transmission assets, storage, and energy-saving applications for consumers;
- Propose tools and control systems to apply generative AI solutions developed in a high-risk use-case (as defined in the AI act).

The developed solutions should be dynamic, flexible, offering reconfigurable automated management, control and data exchange to ensure seamless operations across decentralised a setting.

Projects are expected to:

- Demonstrate AI-powered energy services, tools for power system planning and operation, and smart grid functionalities, such as flexibility, and electric vehicle (EV) charging as well as possibly transmission system operation across at least three EU member states and/or associated countries to enhance demand flexibility and drive innovative capabilities for decarbonisation and energy efficiency;
- Indicate which generative AI basic tools, including available tools from the AI Factories, will be used and demonstrate how energy sector users will be involved in the development and the testing (and possible uptake) of the generative AI tools by the project;
- Indicate what types of assets and what data sources will be used and involve in the project;
- Involve both traditional energy stakeholders and new entrants, such as energy service companies, aggregators, digital infrastructure providers, system integrators, energy asset manufacturers, energy communities, and active consumers;
- Leverage relevant European and international standards and technical specifications, and actively engage with standards development organisations;
- Contribute to the BRIDGE initiative<sup>132</sup>, actively participate in its activities;
- Make use of the AI Factories and solutions, open-source where relevant, developed in previous Horizon Europe projects, particularly those related to flexibility markets and data exchange, Internet of Things and edge-cloud computing, adhering to relevant standards and engaging with standards development organisations to further develop these standards;
- Demonstrate how the new solutions can be integrated into and/or replace (parts of) existing legacy systems, including (for projects that focus on DSOs) demonstrate how the new solutions can integrate core functions of grid operations including SCADA systems functionality;
- Jointly provide a diverse set of applications of generative AI.

**HORIZON-CL5-2026-02-D3-20: Innovative tools and services to manage and empower energy communities**

<b>Call: Cluster 5 Call 02-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 10.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a

<sup>132</sup>

<https://bridge-smart-grid-storage-systems-digital-projects.ec.europa.eu/>

	proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 20.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.

**Expected Outcome:** Project results are expected to contribute to all of the following expected outcomes:

- Integration of home and building assets in an efficient way based on common Internet of Things (IoT) communication standards for smart homes and using SGAM architecture and data models (e.g., IEC CIM) for load, generation and storage devices;
- Facilitate local energy trading and distributed grid-oriented services using micro market and transactions (e.g., peer-to-peer) and improve the market participation for consumers;
- Enhance the integration of energy communities in European energy grids and increase the renewable energy share and use of flexibility by providing transparent and efficient market-based cost sharing mechanisms;
- Increase the security of data exchange, for prosumer and customer resources, and independent (commercial) asset operators;
- Increase synergies using a cross-sectoral approach (e.g., electricity, gas, mobility, heating/cooling) at the level of customer/prosumer and/or energy communities;
- Empower local governments and intermediaries, strengthen overall community energy policies in EU Member States and enhance tool accessibility and user capacity at local level to promote a decentralised and co-owned energy transition.

**Scope:** The project should:

- Develop innovative and open-source tools for managing shared energy community assets (e.g., energy storage facilities) and optimising energy community management (e.g., selection and switching of aggregators, preparation and trading of smart contracts, peer-to-peer and energy sharing, self-consumption);
- Develop open-source tools for forecasting, prediction and advanced data analysis using AI tools and in-depth data analysis for customers and prosumers for autonomous optimisation of consumption, production, storage, smart devices (appliances), and electric vehicle (EV) both at household and energy community levels;
- Extend DSO SCADA and substation systems for autonomous control of grid assets and seamlessly integrate these systems with home and building energy management systems for direct and fast control and data acquisition to implement local (distribution) grid

services (constrain alleviation, grid reconfiguration, restoration of supply, maintenance, and enhancement of energy quality), real-time assessment and monetisation of the use of grid resources;

- Integrate the three elements above as a basis to establish a platform for cooperation between individual customers or prosumers, entire energy communities, wide area aggregators, and DSOs to provide, acquire, and settle energy system-oriented services (system-wide balancing, support of frequency regulation). The cooperation platform should be based on a plug-and-play integration of the energy community eco-system components (hardware and software), using and extending relevant communication standards and data models. The integration mechanism should be embedded within the core systems used by customers/prosumers, DSO (and TSO), aggregators and market operators, fully aligned with SGAM;
- Develop tailored security solutions for private and public communication networks used by IoT apps and devices (smart appliances) across energy carriers;
- Ensure the follow-up and implementation of EU policy measures, including by conducting quality assessments and introducing national community energy targets;
- Foster institutional allies at local and regional levels;
- Provide access to and capacities for using digital planning tools;
- Nurture knowledge and method integration across STEM and SSH disciplines to develop practices to effectively implement community-led initiatives.

Preferably semantically interoperable interactions, as enabled by the ETSI SAREF ontologies, are used. Furthermore, the project should follow the IEC TR 63097 Smart Grid Roadmap, and where relevant, the developed solutions should be open for off-shelf integration using common communication and data standards.

The project should benefit from the direct participation of energy communities, smart appliances manufacturers, home energy devices manufacturers, home and building energy management system developers, Distribution System Operators (DSOs), and aggregators.

However, in order to comply with Article 33, 36 and 54 of Directive (EU) 2019/944, TSOs or DSOs participating in this project should not own, develop, manage or operate energy storage facilities or recharging points for electric vehicles. Moreover, the role of the distribution system operator in facilitating peer to peer trading should be without prejudice to the rules in Article 35 Directive (EU) 2019/944.

The developed solutions have to be tested within, at least, five energy communities from at least three European countries. Technical and social characteristics should be used in the project to validate the developed solutions' credibility. The demonstration sites should cover complex and technologically advanced energy communities, each located within the range of neighbouring secondary substations supplying a variety of customers/prosumers with close-

to-autarky local energy generation, a full range of energy vectors, a significant share of storage facilities, and flexible topology already available or to be achieved as an integral part of the project. The secondary substation should be already equipped with advanced monitoring and control systems.

The selected projects are expected to contribute to the BRIDGE initiative and actively participate in its activities. Additional contributions to the ‘Alliance for Internet of Things Innovation’ (AIOTI) and other relevant activities (e.g., clusters of digital projects and coordinating actions) might be considered when relevant.

In particular, this topic requires the effective contribution of SSH disciplines and the involvement of SSH experts, institutions as well as the inclusion of relevant SSH expertise, in order to produce meaningful and significant effects enhancing the societal impact of the related research activities.

**HORIZON-CL5-2025-02-D3-21: Cross-regional network and market model for optimisation of long duration storage**

<b>Call: Cluster 5 Call 02-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 7.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 14.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>133</sup></p>

<sup>133</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

**Expected Outcome:** Project results are expected to contribute to all of the following expected outcomes:

- Energy system planners and operators will be able to better optimise overall system value of Long-Duration Energy Storage (LDES) for cross-regional networks and markets dominated by intermittent and stochastic renewable energy sources.
- Optimised LDES integration in relevant grid locations will help energy system stakeholders to maximise total lifetime cost-benefit, improved grid-operation as well as avoided fossil fuel use and CO<sub>2</sub> abatement, renewable energy balancing and reduced need for network reinforcement;
- Finetuned business cases for revenue stacking for multiple services as well as detailed overview of marginal abatement costs of various technologies and their combinations across the participating regions will help operators, planners and investors to take the right long term strategic decisions concerning LDES integration in the energy system.
- Cost effective decarbonisation and market revenue streams to improve LDES economics (e.g., nodal and locational pricing) will increase investors trust and therefore accelerate LDES roll out.

**Scope:** The project will develop and test a new, advanced, integrated model for cross-regional networks and markets that are dominated by intermittent and stochastic renewable energy sources. This spatial-temporal model should be designed to create, analyse and optimize scenarios for strategically integrating, locating and dimensioning LDES (here defined as: >12h) for a future European energy system.

The project should be based on a complete understanding of existing operational systems in at least two adjacent regions (NUTS 2 or 3) – best represented in the form of a digital twin (or similar). Consortia should include the respective system service providers, technology providers, potential financial actors and other relevant stakeholders.

The project should produce practical, operationally useful knowledge on cross-regional strategies for combining a variety of clean flexibility LDES solutions/technologies and cross-sector integration, focusing on the optimal combination of LDES with RES production sites, industrial complexes and districts (e.g. co-location and hybridisation), to support the grid.

This topic will analyse the overall system value of integration of LDES (>12h) in the energy system under different future decarbonisation pathways, assessing the impact on operation and planning of energy infrastructure costs as well as security of supply, system reliability and resiliency.

The scope is to maximise the benefit of LDES integration within the context of system wide optimisation of long-term grid enhancement strategies. This encompasses relevant, validated historical data sets, visualisation, scenario analysis, model sensitivity analysis and data set optimisation, optimal use of previously developed models and digital twins, cyber security, use of open-source solutions and free licensing.

The project is expected to identify technical and regulatory barriers, and propose possible recommendations and policy actions, to promote the best solutions tackling these barriers and support replication of the solutions.

**HORIZON-CL5-2026-02-D3-22: Underground Thermal Energy Storage in dense urban areas**

<b>Call: Cluster 5 Call 02-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 9.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 18.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>134</sup>.</p>

Expected Outcome: Project results are expected to contribute to all of the following expected outcomes:

- Advanced European innovative knowledge basis and increased technology competitiveness in the area thermal storage;
- Improved security of the future European renewable-based energy system;
- Contribution to the decarbonisation of cities and densely populated urban areas with high safety solutions;
- Significant reduction of LCOHS (Levelised Cost of Heat Storage);

<sup>134</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/lump-sum-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/lump-sum-decision_he_en.pdf)

- Local communities are engaged and their expectations are responded to.
- Technology developers practice inclusive societal engagement which is early, continuous, and sensitive to the technical specificities (e.g. local resource, subsurface uncertainties) and social challenges (e.g. low public awareness) of underground thermal energy storage technologies in the context of densely populated urban areas.

**Scope:** In scope are novel technologies, interfaces, design methods and organisational concepts that result in the most effective and sustainable use of subsurface space in dense urban areas by Underground Thermal Energy Storage (UTES) systems such as ATES, CTES and BTES.

Proposals should consider the integration in the existing energy grids and interaction with other urban uses of the subsurface (e.g., subways, underground utilities, buildings), including structural foundation elements of buildings, tunnels, slabs, energy sheet pile walls, etc., with potential geothermal heating, cooling, and sinks or storage opportunities.

Proposals should address the uncertainties in the seasonal energy demand to increase the predictability of the required subsurface space, the interactions among systems for the sake of optimal use of subsurface and thermal efficiency.

Projects are expected to deploy one or more demonstrators and can address, for example, one or more of the following exemplary areas:

- Optimal utilisation of geothermal resources and thermal energy storage in urban settings, addressing high (above 70 degrees Celsius), medium (30-70 degrees Celsius) and/or low temperatures (10-30 degrees Celsius) and possible requirements for retrofitting of the building stock;
- Subsurface models for a sustainable underground thermal storage and geothermal use in cities;
- The integration of heat pumps, advanced thermal storage, and interface with district heating infrastructures to contribute to the thermal and power grid flexibility;
- Studying the impact of subsurface urban heat islands (SUHI) on the potential of shallow geothermal energy use in cities, using long-term subsurface monitoring networks and models;
- Best practices strategies for subsurface land-use plans in European cities; Well/borehole placement strategies;
- Mutual interactions between systems, effect on efficiency of storage, and energy performance;
- Management of energy grids on an urban scale and system optimisation thorough digital twins predicting operational, environmental and economic response, as well as the interaction between the storage system and the local grids, under different scenarios;

- Creation of large (time and scale-wise) open multisensory datasets to foster heat energy storage at the European scale which should adhere to the FAIR data principles, adopt data quality standards, data integration operating procedures and GDPR-compliant data sharing/access good practices developed by the European research infrastructures, where relevant.

Consideration should be given to de-risking solutions, and dedicated support schemes that guide innovative energy storage technologies through to the commercialisation stage. The consortium should assess the current regulatory context and provide recommendations linked to the proposed solutions for shaping future needs (e.g., regulatory, standardisation, permitting). In addition, appropriate local community engagement initiatives as well as expectations and experiences of underground thermal storage infrastructures (and to what extent it varies in dense urban areas) should be explored.

This topic requires citizens engagement and dialogue and the effective contribution of SSH disciplines and the involvement of SSH experts, institutions as well as the inclusion of relevant SSH expertise, in order to produce meaningful and significant effects enhancing the societal impact of the related research activities and ensure the translation of innovation into real-life outputs.

**HORIZON-CL5-2025-02-D3-23: Critical elements for energy security of grid and storage technologies**

Call: Cluster 5 Call 02-2025 (WP 2025)	
Specific conditions	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 3.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 9.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 4-5 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Procedure</i>	<p>The procedure is described in General Annex F. The following exceptions apply:</p> <p>Proposals are expected to clearly address only one of the following areas:</p> <ul style="list-style-type: none"> <li>• Advanced tools to address cybersecurity risks to energy system transmission and distribution and renewables to storage and</li> </ul>

	<p>storage to energy network interface technologies;</p> <ul style="list-style-type: none"> <li>• Increasing circular economy processes, recycling, re-use or substitution of sustainably supplied critical materials and electronics for energy network and storage technologies;</li> <li>• Sustainability and public perception of energy network and storage technologies as a limiting factor for their required capacity build-up and efficient performance in a secure energy system (e.g. hydropower, CAES storage);</li> </ul> <p>To ensure a balanced portfolio covering all above areas, grants will be awarded to applications not only in order of ranking but at least also to one project that is the highest ranked within each area, provided that the applications attain all thresholds (and subject to available budget). This will allow to fund at least one project under each area.</p>
<p><i>Legal and financial set-up of the Grant Agreements</i></p>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>135</sup>.</p>

Expected Outcome: Project results are expected to contribute to some of the following expected outcomes:

- Development of advanced solutions strengthening energy security of energy network and storage technologies for renewable energy;
- Contribution to strengthened European technology knowledge base on energy system security;
- Solutions addressing key aspects improving the technological and cross-cutting value chain aspects for energy security of grid and storage technologies are developed;
- Improved security of the future European renewables- based energy system as an important factor in its cost-effectiveness and therefore directly impacting European competitiveness;

<sup>135</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

- Creation of European technological leadership in the energy security field and creation of a knowledge base for European industrial competitiveness.

**Scope:** Development of novel solutions, which address specifically critical aspects affecting the energy security of energy network and/or storage technologies. As energy security of the energy grid and safe storage of variable renewables is directly related to a cost-effective and sustainable European energy system and therefore essential to European competitiveness, not only energy security aspects of the grid and storage technologies as such, but also those related to their respective value chains need to be addressed. Proposals should focus on development of solutions for grid and/or storage technologies, which can highly improve their sustainability, resilience, and overall energy security performance in the European context in the long run. Proposals should take into consideration the results of the Study on clean energy R&I opportunities to ensure European energy security by targeting challenges of distinct energy value chains for 2030 and beyond<sup>136</sup>.

Project should address precisely only one of the following areas:

- Advanced tools to address cybersecurity risks to energy system transmission and distribution and renewables to storage and storage to energy network interface technologies;
- Increasing circular economy processes, recycling, re-use or substitution of sustainably supplied critical materials and electronics for energy network and storage technologies;
- Sustainability and public perception of energy network and storage technologies as a limiting factor for their required capacity build-up and efficient performance in a secure energy system (e.g., hydropower, CAES storage).

Furthermore, essential skills and efficient skills management within the overall energy network and storage system in respect of skilled labour being an important transversal value chain component should be addressed.

### **Carbon Capture, Utilisation and Storage (CCUS)**

Proposals are invited against the following topic(s):

#### **HORIZON-CL5-2026-02-D3-24: New CO2 capture technologies**

<b>Call: Cluster 5 Call 02-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU</i>	The Commission estimates that an EU contribution of around EUR 6.00

<sup>136</sup> European Commission, Directorate-General for Research and Innovation, Schleker, T., Hicks, M., Cressida Howard, I. et al., *Study on clean energy R&I opportunities to ensure European energy security by targeting challenges of distinct energy value chains for 2030 and beyond final report*, Schleker, T.(editor), Publications Office of the European Union, 2024, <https://data.europa.eu/doi/10.2777/906828>

<i>contribution per project</i>	million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 18.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 5 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Procedure</i>	<p>The procedure is described in General Annex F. The following exceptions apply:</p> <p>In order to ensure a balanced portfolio of activities covering both point-source capture and direct air capture technologies, grants will be awarded not only in order of ranking but at least also to one proposal dealing with the technology that has not been covered by the proposal selected first, provided they attain all thresholds (and subject to available budget). This condition to ensure a balanced portfolio will also be considered to be met if one project addressing both aspects is funded.</p>
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>137</sup></p>

**Expected Outcome:** Project results are expected to contribute to the following expected outcomes:

- New capture technologies (either from points sources or directly from air) should lead to reduced overall cost of capture, as well as lowest possible negative environmental impact, including water use.

**Scope:** Development of new or emerging capture technologies with high potential for cost reduction. Proposals can address capture of CO<sub>2</sub> either from point sources or directly from air (direct air capture, DAC). Depending on the capture routes chosen (e.g., solvents, sorbents, membranes, cryogenic, solid looping), examples of important issues to address include

<sup>137</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

enhanced absorption/adsorption, improved kinetics and reduced energy use for CO<sub>2</sub> capture and desorption, new materials, flexibility of operation, modularisation and scale-up, space occupation, degradation and life span of capture materials, ability for retrofit, potential for heat integration, and solvent-induced corrosion.

In particular for DAC, examples of important issues to address are novel sorbent or solvent materials that have higher CO<sub>2</sub> capture capacities and longer-term stability in the presence of heat and air. For all proposals, minimalization of health and environmental impact must be addressed in the project also in view of future scaling up. The developed technologies should aim at delivering CO<sub>2</sub> at the specifications required for transport and storage, with very low levels of impurities.

For point-source capture, the technologies should address the performance profile and characteristic when operating under variable operating conditions such as load changes to maintain and as high as possible capture rate across the entire operating profile. Results from point-source capture should provide good matches between specific industrial application and capture technology while guaranteeing the quality and continuity of the industrial process.

The use of the European Research Infrastructure for CO<sub>2</sub> Capture, Utilisation, Transport and Storage ECCSEL is encouraged but not mandatory.

In particular for DAC, international cooperation with participating countries of the Mission Innovation Carbon Dioxide Removal Mission<sup>138</sup> is encouraged.

#### **HORIZON-CL5-2025-02-D3-25: Effects of CO<sub>2</sub>-stream impurities on CO<sub>2</sub> transport and storage**

<b>Call: Cluster 5 Call 02-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 10.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Procedure</i>	<p>The procedure is described in General Annex F. The following exceptions apply:</p> <p>In order to ensure a balanced portfolio of activities covering either transport infrastructure or storage infrastructure, grants will be awarded not only in order of ranking but at least also to one proposal dealing</p>

<sup>138</sup>

Carbon Dioxide Removal – Mission Innovation (mission-innovation.net)

	with the application that has not been covered by the proposal selected first, provided they attain all thresholds (and subject to available budget). This condition to ensure a balanced portfolio will also be considered to be met if one project addressing both aspects is funded.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>139</sup></p>

**Expected Outcome:** The design and safe operation of a CO2 transport and storage system represent specific challenges as it involves CO2 streams at different flow rates, pressures and states (liquid, gaseous, super critical), and with different compositions and impurities. The presence of impurities will change the chemical and thermophysical properties with respect to a pure CO2 fluid. When CO2 is transported in pipelines at conditions close to its critical temperature and pressure, the impact of impurities on the thermophysical properties can become substantial. High levels of CO2 stream purity must be achieved to avoid two-phase flow during pipeline transportation. In addition, reactive impurities can impact on injectivity, well integrity and seal integrity of geological storage sites. Directive 2009/31/EC regulates that CO2 streams may contain incidental associated substances from the source, capture or injection process, but the concentrations of these substances should be below levels that would adversely affect the integrity of the storage site or the relevant transport infrastructure, and not pose a significant risk to the environment or human health. Member States should ensure that storage site operators only accept and inject CO2 streams if a risk assessment shows that these conditions are met.

The Communication on Industrial Carbon Management<sup>140</sup> underlines the need for pre-normative research on the physical and chemical behaviour of impure CO2 in order to contribute to relevant guidelines and standardisation work. This was also emphasised in a report prepared by a stakeholder group on CO2 standards under the CCUS Forum<sup>141</sup>.

Project results are expected to contribute to all of the following expected outcomes:

- Contribution to an accurate understanding of the effects of impure (and possibly corrosive) CO2 flows along the transport network (in particular pipelines and shipping)

<sup>139</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

<sup>140</sup> [EUR-Lex - 52024DC0062 - EN - EUR-Lex \(europa.eu\)](#)

<sup>141</sup> <https://circabc.europa.eu/ui/group/75b4ad48-262d-455d-997a-7d5b1f4cf69c/library/13c2a475-c705-432d-8ca3-17ce799ba502/details>

or in the storage complex in line with Art. 12 of Directive 2009/31/EC, including any engineered or geological barriers to leakage in the near-well region;

- Inform relevant guidelines and contribute to standardisation work through improved understanding of the physical and chemical behaviour of impure CO<sub>2</sub>.

**Scope:** Based on the application chosen (transport or storage), projects have to deliver:

- Recommendations for design and operation of pipelines and/or ship offloading, including recommendations for public health and safety requirements and for protective and/or mitigating material and/or approaches and/or monitoring technology to avoid adverse effects on the integrity of the relevant transport infrastructure caused by impurities;
- Recommendations for public health and safety requirements and for protective and/or mitigating material and/or approaches and/or monitoring technology to avoid adverse effects on the integrity of the storage complex;
- Guidance and recommendations for technology providers, regulatory authorities, certification and standardisation bodies, and define and implement ambitious dissemination actions to promote the project results and support their uptake.

Projects can address, for example, the following issues:

- Transient flow modelling along the pipeline network and;
- Combined thermodynamic and corrosion modelling to predict corrosion rates under different conditions;
- Reactive transport and geochemical modelling of the storage reservoir in the near-well zone, including associated geological barriers to leakage;
- Generation of experimental data on the geochemical reactions of reservoir rocks, caprocks, well cements and fault seals exposed to impure CO<sub>2</sub> under the span of pressure and temperature regimes relevant for planned and future storage projects in saline aquifers and/or depleted hydrocarbon reservoirs, to tune existing and/or new models;
- Generation of experimental data on thermophysical and corrosive properties of CO<sub>2</sub>-rich mixtures under CCS-relevant conditions, to tune existing or new models;
- Impact of impurities on various equipment (e.g., valves, gaskets, compressors, instrumentation), in particular on non-metallic components in the CO<sub>2</sub> transportation system;
- Impact of impurities on the physical behaviour and geochemical interaction of the CO<sub>2</sub> stream within the storage complex;

- Development of a systematic method to understand limits for impurities and define specifications for transport and storage infrastructure.

The use of the European Research Infrastructure for CO<sub>2</sub> Capture, Utilisation, Transport and Storage ECCSEL is encouraged but not mandatory.

Selected projects are encouraged to seek synergy with possible standardisation activities performed by CEN, CENELEC and ETSI on pre-normative research for standards for the transport and permanent storage of carbon dioxide<sup>142</sup>.

International cooperation is encouraged, in particular with projects or partners from the United States.

**HORIZON-CL5-2025-02-D3-26: European investment atlas of potential CO<sub>2</sub> storage sites**

Call: Cluster 5 Call 02-2025 (WP 2025)	
Specific conditions	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 5.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>143</sup>.</p>

**Expected Outcome:** The emergence of a Carbon Capture and Storage (CCS) value chain in the European Union and Associated Countries is currently being hampered by a lack of a clear pathway to mature CO<sub>2</sub> storage sites. In the Net Zero Industry Act regulation, the EU has defined the objective that at least 50 million tonnes of CO<sub>2</sub> per year can be stored geologically

<sup>142</sup> Open call for proposal, 6 June 2024. See: [Support to Standardisation activities performed by CEN, CENELEC and ETSI - European Commission \(europa.eu\)](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/simplified-costs-decisions_en.pdf)

<sup>143</sup> This [decision](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/simplified-costs-decisions_en.pdf) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/simplified-costs-decisions\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/simplified-costs-decisions_en.pdf)

by 2030, in storage sites located in the territory of the European Union, its exclusive economic zones or on its continental shelf within the meaning of the United Nations Convention on the Law of the Sea (UNCLOS) and which are not combined with enhanced hydrocarbon recovery.

Project results are expected to contribute to the following expected outcome:

- Contribute to enhancing the availability of CO<sub>2</sub> storage sites and providing transparency about potential CO<sub>2</sub> storage and injection capacity and infrastructure, including an evaluation of the impact of pressure interference from neighbouring storage projects, which can support market operators to plan their investments and enable the implementation of large-scale storage hubs connected to shared CO<sub>2</sub> transport infrastructure.

**Scope:** The project is expected to produce a digital atlas of ‘investable’ underground storage space for CO<sub>2</sub> in the EU and Associated Countries. The European CO<sub>2</sub> Storage Atlas<sup>144</sup> currently under revision and being updated by the GSEU project<sup>145</sup>, including estimated capacity and storage readiness level, presents a good basis, but also shows that data gaps need to be closed, and access to the necessary data during project implementation will be crucial. The Commission's Energy and Industry Geography Lab<sup>146</sup> can also be used. Proposals are expected to include the following:

- Identify and assess with a harmonised methodology, injection and storage capacities for current and planned projects and compare with storage requirements;
- Identify key regions for future pre-licence appraisal (high estimated capacity, proximity to emitters, transport corridors), and develop plans for pre-licence appraisal, per region;
- Each potential storage site must be labelled according to its ‘storage readiness level’ in line with the storage readiness level included in the GSEU atlas, and matched with public data to speed up the work to identify and assess the storage capacities and what is needed to mature understanding of the site. Furthermore, the identified potential storage sites should be compared and ranked by applying a common ranking scheme developed based on currently used ranking schemes and including a techno-economic assessment;
- Environmental aspects must be taken into account.

The proposal is expected to explicitly demonstrate the capacity to have access to the necessary data during the implementation of the grant. Cooperation with relevant national and/or regional actors in the management of the subsurface, such as geological surveys or competent authorities, will be key.

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<sup>144</sup> [European CO<sub>2</sub> storage database - European Commission \(europa.eu\)](#)

<sup>145</sup> GSEU ([geologicalservice.eu](#))

<sup>146</sup> [Energy and Industry Geography Lab - European Commission \(europa.eu\)](#)

**HORIZON-CL5-2025-02-D3-27: Using captured CO<sub>2</sub> as a resource to replace fossil fuels in industrial production**

<b>Call: Cluster 5 Call 02-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 7.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 14.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 6 by the end of the project – see General Annex B. Activities may start at any TRL.

**Expected Outcome:** Project results are expected to contribute to all of the following expected outcomes:

- Unlocking the economic potential of CO<sub>2</sub> utilisation. Strengthening the industrial carbon management value chain through the delivery of innovative solutions for capturing and recycling CO<sub>2</sub> to produce advanced synthetic fuels, chemicals, polymers or minerals, making them price-competitive and accelerating their market deployment.
- Contributing to emission reduction, energy security and autonomy of the EU through the gradual substitution of fossil-based feedstocks in the production of chemicals and materials by alternative feedstocks, like waste and residues, and captured CO<sub>2</sub>.

**Scope:** Proposals have to aim at reducing the capital intensity and energy and environmental footprint CO<sub>2</sub> conversion technologies in order to allow for upscaling in the short to medium term.

In particular, proposals are expected to:

- Provide information and assessment about the economic feasibility and the potential of scaling-up the proposed solutions at commercial scale as appropriate.
- Adapt the conversion process to the intermittent nature of renewable electricity supply.
- Reduce the use of virgin critical raw materials.
- Define ambitious but achievable targets for energy requirements of the conversion process, production costs and product yields, as well of price competitiveness, that will be used to monitor project implementation.

- Define minimum CO<sub>2</sub> concentrations and maximum impurities levels that the conversion process can tolerate. Solutions that can cope with less pure CO<sub>2</sub> streams will improve the overall energy efficiency.
- Apply rigorous life-cycle analysis (LCA) to ensure that the proposed solution is comprehensively assessed on its ability to contribute to long-term sustainability: climate mitigation, adaptation, biodiversity, water use, pollution, and virgin resources depletion. The LCA must be in line with guidelines developed by the Commission, such as the Innovation Fund GHG methodology and the relevant ISO standards and the EU Taxonomy Regulation.

Proposed solutions will focus on the CO<sub>2</sub> conversion process, although integration in industrial capture or direct air capture facilities can be included.

Enhanced oil, gas or coalbed methane recovery (EOR/EGR/ECBM) are out of scope of this topic.

Plans for the exploitation and dissemination of results for proposals submitted under this topic must include a strong business case including an analysis of equivalent final products in the market, and a sound exploitation strategy. The exploitation plans must include preliminary ideas for scalability, commercialisation, and deployment (feasibility study, business plan, financial model) indicating the possible funding sources to be potentially used (in particular the Innovation Fund).

## Efficient, sustainable and inclusive energy use

This Destination targets the energy demand side, notably a more efficient use of energy in buildings and industry. It contributes to the activities of the Strategic Energy Technology Plan (SET Plan) and its implementation working groups.

This Destination contributes directly to the Strategic Plan's **Key Strategic Orientations** '*Green transition*', '*Digital transition*' and '*A more resilient, competitive, inclusive and democratic Europe*'.

In line with the Strategic Plan, the overall **expected impact** of this Destination is to contribute to the '*Using energy in buildings and industry in an efficient, affordable and sustainable way*'.

### The main impacts to be generated by topics under this Destination are:

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

1. The life-cycle energy performance and resource efficiency of the European building stock is improved at an accelerated pace and contributes to the EU's energy security.
2. The renovation and construction are cost-efficient, affordable and less disruptive, have reduced climate and environmental impact through circularity, and use of low-carbon materials.
3. The buildings in Europe are increasingly interacting with the users, energy system and their environment contributing to an integrated, resilient, secure and flexible operation.
4. The buildings and built environment in Europe mitigate climate change and are more resilient.
5. The built environment is inclusive and delivers a better quality of life for all users.

#### Industry

The energy efficiency of EU energy intensive industries is improved, their consumption of fossil fuel and their GHG and other pollutants emissions are drastically reduced, while preserving / enhancing their global competitiveness.

#### **Highly energy-efficient and climate neutral European building stock**

Proposals are invited against the following topic(s):

**HORIZON-CL5-2026-02-D4-01: On-site innovative robotics and automated solutions and techniques for more sustainable and less disruptive building renovation and construction**

**Call: Cluster 5 Call 02-2026 (WP 2025)**

<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 15.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 4-5 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>147</sup></p>

**Expected Outcome:** Project results are expected to contribute to all of the following expected outcomes:

- Measurable reduction in overall time spent on site for renovation and construction, compared to current best practices;
- Measurable increase in resource efficiency, as well as improved accuracy (designed vs. as-built), of on-site renovation and construction works, compared to current best practices;
- Measurable reduction in noise pollution, air pollution (e.g., particulate matter) and other pollution caused by on-site renovation and construction works, compared to current best practices.

**Scope:** Buildings need to be sustainable and resource efficient, and the rate of deep renovation needs to be increased. This can be accelerated by modernising the construction sector and embracing the latest developments in automated techniques. There is need for further research on innovative robotics and other automated on-site solutions and techniques that make renovation and construction works more sustainable, less disruptive, faster, more accurate, more cost effective and more resource efficient.

<sup>147</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

Proposals are expected to address all of the following:

- Test and validate the use of on-site innovative robotic and automated solutions and techniques both for construction of buildings and for renovation of which at least one must investigate 3D printing;
- Apply a research methodology which allows for a robust comparison of at least the three expected outcomes of the proposed innovative solutions and techniques with current best practices;
- Investigate aspects of worker safety and on-site human-robot collaboration related to the future application of the proposed solutions and techniques;
- Test and validate at least three prototype solutions and techniques to investigate their applicability for a variety of building typologies, duly justified to represent a relevant part of the European building stock. The prototypes should be validated in a lab or another relevant environment. Testing and validation must address solutions for both renovation and construction. The prototypes should be applicable either to renovation, or to construction, or to both, but both renovation and construction need to be addressed in a proposal.

**HORIZON-CL5-2026-02-D4-02: Smarter buildings as part of the energy system for increased efficiency and flexibility – Societal Readiness Pilot**

<b>Call: Cluster 5 Call 02-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 12.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Admissibility conditions</i>	The conditions are described in General Annex A. The following exceptions apply: The page limit is extended by two pages to 47.
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G. The following exceptions apply: Eligible costs will take the form of a lump sum as defined in the

	Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). <sup>148</sup>
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**Expected Outcome:** Project results are expected to contribute to all of the following expected outcomes:

- Measurable reduction in buildings' energy demand together with a reduced gap between their as-designed and as-built energy performance;
- Measurable increase in the number of building typologies with smart grid connected renewable energy sources (RES) and energy storage together with increased flexibility in grid/network management and operations;
- Measurable enhancement of the smart readiness of buildings as rated by the Smart Readiness Indicator and/or other relevant building rating systems;
- Improved responsiveness by the relevant stakeholders to the needs and concerns of users from a diversity of social groups, including vulnerable and disadvantaged ones, involved in or potentially affected by the smart buildings, thereby increasing the potential for beneficial societal uptake and building trust in outcomes.

**Scope:** The construction sector and the building subsector remain among the least digitised. Smart buildings can contribute to reducing energy demand, curbing operational CO<sub>2</sub> emissions, integrating RES and enhancing grid flexibility through optimised energy usage. At the same time, it is essential that smart buildings are flexible and adaptive to changing needs and usage patterns and are user-friendly to encourage widespread adoption of these technologies by grid operators, construction professionals, building facility managers and users. Furthermore, to ensure the societal benefits of the smart building technologies there is a need for increased user knowledge, acceptance and satisfaction.

Proposals are expected to address all of the following:

- Develop solutions that enhance the smartness of buildings by using and facilitate upgrading existing Building Management Systems (BMS) and/or other technical equipment;
- Ensure that the proposed solutions are user-friendly and provide the expected indoor environment quality, as well as user satisfaction and occupant comfort;

<sup>148</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/lump-sum-contributions\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/lump-sum-contributions_en.pdf)

- Demonstrate the proposed solutions in at least three pilots. These pilots should collectively cover at least three different climatic zones, three different building types (residential, tertiary etc.), and three different technical building systems;
- Develop a methodology to measure the achieved energy demand reduction, increased flexibility in the grid, and enhanced interoperability, compared to current best practices;
- Investigate the cost-effectiveness and replicability of the proposed solutions.

This topic is a Societal-Readiness pilot:

- Proposals must follow the specific requirements applying to the Societal readiness pilot, as described in the introduction of the Horizon Europe Main Work Programme 2025 for Climate, Energy and Mobility. They entail the use of an interdisciplinary approach to deepening consideration and responsiveness of research and innovation activities to societal needs and concerns.
- This topic requires effective contribution of the relevant SSH expertise, including the involvement of SSH experts in the consortium, to meaningfully support Societal Readiness. Specifically, SSH expertise is expected to facilitate the socio-technological interface and enable the design of project objectives with Societal Readiness related activities.

**HORIZON-CL5-2026-02-D4-03: Innovative pathways for low carbon and climate resilient building stock and built environment (Built4People Partnership)**

<b>Call: Cluster 5 Call 02-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 15.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 4-5 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for</p>

	Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). <sup>149</sup>
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**Expected Outcome:** Project results are expected to contribute to all of the following expected outcomes:

- Improved planning methods and procedures which are replicable and scalable across Europe, and potentially globally, and that encourage the use of building solutions to improve whole life carbon performance, circularity, sustainability, climate resilience, safety and durability of buildings and the built environment, in line with the commitment of making the EU climate neutral by 2050;
- Measurable increase in the number of relevant value chain actors applying such planning methods, procedures and building solutions for the benefit of citizens;
- Quantified pathways to improved buildings' and built environment's whole life carbon performance.

**Scope:** EU and associated countries continue to develop innovative building solutions that support the decarbonisation and climate resilience of buildings and the built environment, addressing energy performance, circularity, sustainability, resource efficiency, climate resilience, safety, durability and adaptability of the building stock, and whole life carbon reduction. A key challenge remains the accelerated uptake of such solutions in building and renovation projects. There is a need to develop planning methods and procedures, that encourage the use of appropriate building solutions, for the relevant actors in the value chain, municipal and regional authorities, and policy makers to define detailed and practicable pathways for the building stock and the built environment, under their responsibility, to be climate resilient and climate neutral.

Proposals are expected to address all of the following:

- Develop and validate replicable and scalable holistic planning methods and procedures that take account of innovative designs and sets of building solutions for the development and regeneration of the building stock and the built environment. Such designs and solutions include those for the deconstruction and adaptation of buildings enabling owners to easily accommodate changing user needs;
- Validate the planning methods, procedures and sets of technological solutions in a relevant environment in at least three countries, with different climatic conditions and building stock characteristics. In at least two cases, the proposed planning methods and procedures should be relevant for renovation;

<sup>149</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

- Investigate the use of innovative tools and methods which facilitate adaptability to changing user needs, while positively contributing to the occupants' comfort and health;
- Propose and apply a methodology for assessing the effectiveness of the developed pathways, including the calculation of their whole life carbon reduction compared to a "business as usual" scenario;
- Ensure the active involvement of all relevant public and private stakeholders of the whole renovation and construction value chain, which must include among others: municipalities, citizens (including vulnerable groups) and civil society organisations and the building and construction sector professions;
- Contribute to the objectives of the Built4People partnership and its network of innovation clusters<sup>150</sup>.

This topic requires the effective contribution of SSH disciplines and the involvement of SSH experts, institutions as well as the inclusion of relevant SSH expertise (including social innovation), in order to produce meaningful and significant effects enhancing the societal impact of the related research activities.

This topic implements the co-programmed European Partnership on 'People-centric sustainable built environment' (Built4People). As such, projects resulting from this topic will be expected to report on results to the European Partnership 'People-centric sustainable built environment' (Built4People) in support of the monitoring of its KPIs.

#### **HORIZON-CL5-2026-02-D4-04: Innovative approaches for the deployment of Positive Energy Districts**

<b>Call: Cluster 5 Call 02-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 15.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant</i>	The rules are described in General Annex G. The following exceptions apply:

<sup>150</sup> [https://built4people.eu/nebula\\_project/](https://built4people.eu/nebula_project/)

<i>Agreements</i>	Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). <sup>151</sup>
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**Expected Outcome:** Project results are expected to contribute to all of the following expected outcomes:

- Increased number of approaches and solutions enabling a net positive yearly energy balance at district level and the export of excess renewable energy to the grid outside its geographical boundaries, with enhanced replicability on a larger scale in other positive energy districts (PEDs) in different contexts;
- Measurable increase in inclusiveness and level of social acceptance in the demonstration of PEDs;
- Improved user-friendliness and user-awareness of guidelines, tools, and training materials targeting key professionals for overcoming the different types of barriers towards the realisation of PEDs.

**Scope:** Recent projects have demonstrated the feasibility of PEDs, but there is a need to further demonstrate climate-neutral impact, while developing and demonstrating innovative approaches and solutions for overcoming technical, business, social and organisational constraints in several domains. Such domains include, for example, climate mitigation, the integration of renewable energy sources and energy storage in buildings, grid connections, accommodation of distributed energy generation and storage at district level, permitting, data privacy and security and the application of new technologies such as artificial intelligence. Presently, these constraints, which inhibit the demonstration of complete and qualified PEDs, require the cooperation of key professionals from the public and private sector, such as municipal and regional authorities and those from the energy and construction sectors, in complex implementation processes.

Proposals are expected to address all of the following:

- Demonstrate innovative approaches and solutions for overcoming constraints which prevent the successful implementation of PEDs;
- Develop supportive local planning frameworks for the design and realisation of PEDs;

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<sup>151</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

- Demonstrate the proposed approaches, solutions, and supportive local planning frameworks in at least three districts in diverse geographical areas that implement energy efficiency measures alongside renewable energy installations, storage solutions, digital and smart technologies, and local energy communities;
- Develop and/or update existing guidelines, tools, and training materials for key professionals that will enable other cities to successfully replicate these innovative approaches, solutions and supportive local planning frameworks in their district/cities;
- Ensure the active involvement of all relevant public and private stakeholders, including citizens, through co-creation processes and community engagement activities that foster social inclusion.

This topic requires the effective contribution of SSH disciplines and the involvement of SSH experts, institutions as well as the inclusion of relevant SSH expertise (including social innovation), in order to produce meaningful and significant effects enhancing the societal impact of the related research activities.

**HORIZON-CL5-2026-02-D4-05: Optimal combination of low embodied carbon construction products, technical building systems and circularity principles for climate neutral buildings (Built4People Partnership)**

<b>Call: Cluster 5 Call 02-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 12.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 4-5 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the</p>

	Research and Training Programme of the European Atomic Energy Community (2021-2025). <sup>152</sup> .
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**Expected Outcome:** Project results are expected to contribute to all of the following expected outcomes:

- Measurable reduction in whole life-cycle greenhouse gas emissions and uptake of carbon removals in buildings;
- Increased integration of circular approaches for building construction and renovation works, with the aim of minimising lifecycle impacts;
- Availability of more accurate benchmarking and calculation of typical buildings' whole life cycle greenhouse gas emissions and carbon removals, based on Level(s) and consistent with the life-cycle global warming potential provisions under the Energy Performance of Buildings Directive, are available.

**Scope:** Buildings result in greenhouse gas emissions over their whole life cycle (operational and embodied emissions). Buildings can also contribute to long-term carbon removals by storing carbon in construction products. As well as reducing their climate-related impacts, construction and renovation works must meet a variety of inter-related requirements such as structural and fire safety, acoustics, and a healthy and comfortable indoor environment. Although much research has focused on developing materials and products with a lower carbon footprint, the whole life cycle impact and performance of buildings depends on a complex interaction between individual products, components and technical building systems, spatial distribution, usage during their lifetime, and other design choices. There is therefore a need to develop buildings and renovation works with minimal life cycle impacts, in particular global warming potential, based on circularity principles, also accommodating future building use-change through design for flexibility, and using innovative combinations of products and systems that result in optimal building-level performance.

Proposals are expected to address all the following:

- Develop solutions that facilitate optimal combinations of construction products and systems with minimal life cycle impacts at the level of the building. The optimal combinations of products and systems must also account for relevant aspects of performance such as structural integrity, thermal, acoustic and hygrometric, durability, potential for deconstruction and preparation for reuse at end of life, and potential for automated or industrialised installation. The solutions should cover *inter alia* the design and construction phases of work;

<sup>152</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

- Develop decision-related processes and strategies for adaptive reuse of existing structures, such as repurposing buildings as opposed to demolish and rebuild, considering the whole life carbon impact;
- Validate the technologies and solutions in a relevant environment in at least three countries, with different climatic conditions and building stock characteristics;
- Research the whole life carbon impact of the developed solutions on typical building typologies in the chosen countries and contribute to whole life carbon benchmarking efforts;
- Consider the cost effectiveness of the developed solutions including relevant business models;
- Contribute to the development of European standards<sup>153</sup>, where relevant;
- Contribute to the objectives of the Built4People partnership and to the Built4People network of innovation clusters<sup>154</sup>.

This topic implements the co-programmed European Partnership on ‘People-centric sustainable built environment’ (Built4People). As such, projects resulting from this topic will be expected to report on results to the European Partnership ‘People-centric sustainable built environment’ (Built4People) in support of the monitoring of its KPIs.

## Industry

Proposals are invited against the following topic(s):

### **HORIZON-CL5-2026-02-D4-06: Phase out fossil fuel in energy intensive industries through the integration of renewable energy sources**

<b>Call: Cluster 5 Call 02-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 7.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 15.00 million.
<i>Type of Action</i>	Innovation Actions

<sup>153</sup> ‘harmonised standard’ means a standard adopted by one of the European standardisation bodies listed in Annex I to Directive 98/34/EC, on the basis of a request issued by the Commission, in accordance with Article 6 of that Directive

<sup>154</sup> [https://built4people.eu/nebula\\_project/](https://built4people.eu/nebula_project/)

<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.
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**Expected Outcome:** Project results are expected to contribute to all of the following expected outcomes:

- Based on the results of the project, at least one energy intensive industrial subsector<sup>155</sup> in the EU and Associated Countries develops pathways and business models to improve its energy efficiency, and to significantly reduce its consumption of fossil fuel and its emissions of GHG and other pollutants (including air pollutants), while preserving / enhancing its global competitiveness;
- With the goal of completely phasing out the use of fossil fuels in an industrial plant with a significant heating demand, the process(es) is(are) tightly integrated to minimise energy losses and its (their) energy supply relies on the local integration of a combination of renewable energy sources.

**Scope:** Proposals are expected to demonstrate an innovative solution for the efficient, long lasting and cost-effective local integration of one or a combination of renewable thermal, electrical, bioenergy and other renewable energy sources in industrial processes, for heating, cooling and power generation, while optimising process efficiency and reuse, possibly upgrade of excess heat, with the aim of avoiding or drastically reducing fossil fuel use.

Process flexibility and energy storage can also be integrated, to match the energy demand of the industrial process with the variable renewable energy supply profile, and to minimise electricity demand from the power grid. Where possible, the integration with neighbouring industries and/or communities should be considered for the benefit of energy and resources sharing and efficiency.

The solution should be designed to ensure that the industrial process avoids or has very low GHG and other pollutant emissions, ensures high reliability and safety, and high physical and cyber security. It should be physically demonstrated in an industrial environment and be applicable to a significant share of the total energy demand of the industrial plant. The project should demonstrate through numerical simulations that the physically demonstrated solution can be scaled up to completely phase out the use of fossil fuels.

The project should facilitate the future deployment of the solution in the EU and Associated Countries' plants in the same industrial subsector(s). Already before starting the design phase, the needs of most EU and Associated Countries' factories in the same subsector(s) should be surveyed and analysed in order to design a solution that can be adapted to meet most of them, to identify common components to be optimised/standardised and to issue/disseminate technical and economic guidelines.

<sup>155</sup>

Industrial subsectors covered by the EU Emission Trading System Directive 2009/29/EC (Annex I).

Proposals are expected to present a strong business model and sound exploitation strategy for the proposed solution, as outlined in the introduction to this Destination.

DRAFT

## Clean and competitive solutions for all transport modes

This Destination addresses activities that improve the climate and environmental footprint, as well as competitiveness, of different transport modes.

The areas of rail and air traffic management will be addressed through dedicated Institutional European Partnerships and are therefore not included in this document.

This Destination contributes directly to the Strategic Plan's **Key Strategic Orientations** '*Green transition*', '*Digital transition*' and '*A more resilient, competitive, inclusive and democratic Europe*'.

In line with the Strategic Plan, the overall **expected impact** of this Destination is to contribute to the '*Achieving sustainable and competitive transport modes*'.

### The main impacts to be generated by topics under this Destination are:

#### Zero-emission road transport

1. Clean solutions for zero tailpipe emission and environmentally friendly mobility for a climate neutral and zero pollution mobility with a higher level of circularity;
2. Affordable, user-friendly, inclusive, safe, and secure concepts and technologies that are easy to deploy, considering needs, behaviours, and socio-economic status of end-users;
3. Increased global competitiveness of the EU transport sector;
4. Increased responsiveness of zero tailpipe emission vehicles and systems to diverse societal interests and concerns;
5. Use cases and concepts for zero-emission road mobility of people and goods are successfully and innovatively demonstrated.

#### Aviation

1. New and updated Aviation Research and Technology Infrastructures, where the new research and technologies will be developed and tested;
2. Increased understanding and analysis of mitigation options of aviation's non-CO<sub>2</sub> climate impacts. New technologies for significantly lower local air-pollution and noise;
3. Accelerated uptake of sustainable aviation fuels in aviation, including the coordination with Member States and private initiatives.

#### Waterborne transport

1. The shipping industry (shipowners, equipment manufacturers, port authorities, terminal operators, and shipbuilders) will have access to high-power low and zero emission fuel solutions by 2030, leading to lower costs, enhanced energy efficiency, risk mitigation, standardised implementation, and improved operational efficiency through data science.

2. Port operators and ship owners will benefit from increased safety and technical standards on ammonia and hydrogen bunkering, including failure scenarios and risk mitigation;
3. The shipping industry will benefit from lower-cost and flexible battery-based solutions as primary sources of energy, higher safety standards and broader electrification solutions;
4. Shipowners, ship operators and port authorities will have access to OPS (Onshore Power Supply) solutions that will enable them to comply with the current and incoming legislative framework;
5. Policy makers and shipowners will benefit from access to accurate information and assessment methods on the direct energy savings resulting from the use of wind-assisted propulsion (WAP) systems under current legislative frameworks like FuelEU Maritime, contributing to the assessment of GHG intensity of energy used on-board. Shipowners, shipbuilders, and European shipyards will have access to commercially viable, cost-efficient, and easy-to-retrofit WAP solutions deployed at commercial scale, particularly for long-distance shipping;
6. Shipyards will have innovative holistic intelligent design tools for various retrofit solutions, enhancing the competitiveness of European shipyards and marine equipment providers;
7. Governments, port authorities, and shipping companies will benefit from access to standardised systems and tools for monitoring air pollutants and fuel consumption of ships, enabling compliance with current and incoming regulations on ship emissions;
8. Policymakers and enforcement bodies will benefit from innovative tools to fulfil the requirements of the Ship Sourced Pollution Directive resulting in an increased environmental protection of sea waters.

#### *Transport related environment and health*

The better monitoring of the environmental performance and enforcement of emissions regulation and biodiversity protection in order to reduce the overall environmental impact of transport (e.g., as regards biodiversity, noise, pollution and waste) on human health and ecosystems.

#### **Zero-emission road transport**

Proposals are invited against the following topic(s):

**HORIZON-CL5-2025-01-D5-01: Efficient wireless stationary bidirectional charging solutions for road Light Duty Vehicles (2ZERO Partnership) – Societal Readiness Pilot**

**Call: Cluster 5 Call 01-2025 (WP 2025)**

<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 10.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 20.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Admissibility conditions</i>	<p>The conditions are described in General Annex A. The following exceptions apply:</p> <p>The page limit is extended by two pages to 47.</p>
<i>Eligibility conditions</i>	<p>The conditions are described in General Annex B. The following exceptions apply:</p> <p>The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.</p>
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.

**Expected Outcome:** Project results are expected to contribute to all the following outcomes:

- Bidirectional, interoperable low-power wireless (i.e., inductive) stationary charging solutions and services are demonstrated in operational environment for Light Duty Vehicle (vehicle category M1 and N1), with significantly reduced losses of power transfer reaching at least 90% power transfer efficiency in both directions and increased robustness against humidity and dirt, and in all weather conditions (including rain, snow and ice);
- Enhanced electro-magnetic compatibility (EMC) within health and safety limits conforming to international standards (ex. SAE J2954, IEC 61980-1/-2/-3, CISPR 11 and ISO 19363) as well as avoiding interference with relevant telecommunication regulations and Low Frequency(LF)-based navigation systems (e.g., eLORAN);
- Enhanced social acceptance of automatic park and charge functionalities with increased comfort and complete cost/benefit assessment at system-level for acceptable costs;
- Demonstration of the solutions and their efficient integration into the electricity grid in on-street parking (and optionally in parking lots), incorporating advanced V2X technologies to ensure seamless interaction between the vehicles and energy systems to enhance the robustness and efficiency of the wireless charging solutions;

- Responsiveness to a deeper understanding of the needs and concerns of diverse social groups involved in or potentially affected by the R&I development, thereby increasing the potential for beneficial societal uptake and building trust in results and outcomes.

**Scope:** Wireless stationary charging for road light duty vehicles can be a solution to minimise the intrusiveness of the charging infrastructures, which is critical in urban environments. Moreover, it can provide the EV user with a hands-free way of charging, which is of particular benefit for people with disabilities or other weaknesses. The holistic system approach of EV integration into electricity grids entails bi-directional power between EV and the grid to maximise the battery capacity exploitation for grid-and market-oriented services. Recent progress on wireless bidirectionality of charging technologies motivates the need for additional demonstrations with further improved efficiency<sup>156</sup>. The focus of this topic is the development of the charging system, the integration of the system into the vehicle and its demonstration in real life operations. Limited optimisations concerning on-board systems not directly related to the wireless charging (e.g. BMS and battery) may be included if properly justified.

Proposals are expected to address **all** the following aspects:

- Design, develop and demonstrate cost-effective, standardised, safe, visually not intrusive, efficient technologies, solutions and user-centric services offered for bi-directional automatic wireless charging for road Light Duty Vehicles;
- Investigate ways to maximise efficiency through charging plate and power electronic design and positioning (such as auto-positioning of vehicle and/or transmitters/receivers) to increase comfort and social responsiveness of parking and stationary charging;
- Avoid detrimental effects from obstacles such as garbage or amounts of dirt that might interfere with the power transfer and/or might cause damage;
- Efficient system integration of bidirectional wireless charging infrastructures and services to support Renewable Energy Sources (RES) deployment, grid balancing, and investments analysis, making use of generative AI where beneficially applicable;
- Projects are expected to analyse the environmental footprint of the solution following a Life Cycle Assessment (LCA) approach including reuse, repair and recycling/recovery, in particular to reduce use of critical materials. of raw materials, and perform a Costs-and-Benefits analysis on the development and the deployment of the proposed solutions;
- Solutions and services should be demonstrated in at least three different urban areas (peri-urban and/or rural are excluded) within Horizon Europe participating countries considering different climatic conditions and for a period of at least three months;

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<sup>156</sup> As examples, see projects funded under call FP7-TRANSPORT GC.SST.2013-1 and H2020- LC-GV-03-2019

- Exploitation of synergies with projects related to the Software-Defined Vehicle of the Future<sup>157</sup> is encouraged where applicable.

This topic is a Societal-Readiness pilot:

- Proposals must follow the specific requirements applying to the Societal readiness pilot, as described in the introduction of the Horizon Europe Main Work Programme 2025 for Climate, Energy and Mobility. They entail the use of an interdisciplinary approach to deepening consideration and responsiveness of research and innovation activities to societal needs and concerns.
- This topic requires effective contribution of the relevant SSH expertise, including the involvement of SSH experts in the consortium, to meaningfully support Societal Readiness. Specifically, SSH expertise is expected to facilitate the socio-technological interface and enable the design of project objectives with Societal Readiness related activities.

The project(s) should contribute to the activities of existing working groups for the definition of standards for EV wireless charging.

The project(s) should take account Open Science, its practices and learning, and the project's results will be enacted in line with FAIR principles for data<sup>158</sup>.

Proposals should consider the involvement of the European Commission's Joint Research Centre (JRC) whose contribution could consist of performing experimental or desk-top research on Electromagnetic Compliance and Safety.

This topic implements the co-programmed European Partnership on 'Towards zero emission road transport' (2ZERO). As such, projects resulting from this topic will be expected to report on the results to the European Partnership 'Towards zero emission road transport' (2ZERO) in support of the monitoring of its KPIs.

### **HORIZON-CL5-2025-01-D5-02: Cybersecure and resilient road e-mobility ecosystem (2ZERO Partnership)**

<b>Call: Cluster 5 Call 01-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 10.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and

<sup>157</sup> See Call HORIZON-KDT-JU-2023-3-CSA-IA, HORIZON-CL5-2024-D5-01-05 and HORIZON-JU-Chips-2024-1-IA-T3

<sup>158</sup> Final Report and Action Plan from the European Commission Expert Group on FAIR Data, "TURNING FAIR INTO REALITY" - [https://ec.europa.eu/info/sites/info/files/turning\\_fair\\_into\\_reality\\_0.pdf](https://ec.europa.eu/info/sites/info/files/turning_fair_into_reality_0.pdf)

	selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 10.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 7 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>159</sup>.</p>

Expected Outcome: Project results are expected to contribute to all the following outcomes:

- A (holistic) architecture integrating cyber-resilient hardware and software modules, such as Hardware Secure Modules considering state-of-the-art cryptographic primitives/technologies (e.g., Post-Quantum Cryptography) to enhance the security, resilience, and robustness of e-mobility systems;
- Implementation and demonstration in real-life environment of cybersecure e-mobility and system tools based on open-source framework, and on use cases for testing, verification, and certification;
- Guidelines towards future mitigation plans, such as advanced cryptographic solutions, over-the-air software corrections etc. for enhanced cybersecurity in short period of time;
- Guidelines towards a data breach response plan for the ecosystem as a framework that sets out the roles and responsibilities involved in managing a breach;
- Hardened Electric Vehicle Supply Equipment (EVSE) against natural hazards, vandalism and criminal tampering by cyber-attacks and physical intrusion.

Scope: The system approach of the e-mobility entails the interconnection of several e-mobility actors with the technologies (EVs, EVSEs) and e-mobility users but also the establishment of communication interfaces among e-mobility/energy actors via different ICT systems, front-end and back-end systems. On one hand, the charging infrastructures should be open and accessible (to everyone, for all users, for all types of EVs, software systems,

<sup>159</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

charging protocols and apps, communication networks) and, on the other hand, they must fully comply with the Cyber-Resilience Act (CRA) by November 2027 and hence be secured from hackers, criminals, and other malicious parties. It is critical to ensure that all these interactions are secured and reliable, also considering the transition of the automotive industry towards the software-defined vehicle (SDV) concept and the continuous Over-The-Air (OTA) software (SW) updates. A cyber-attack on any level of the e-mobility ecosystem may have financial and/or operational implications which might result in wider disruptions, up to nationwide power outage.

Proposals are expected to address **all** the following aspects:

- Develop a secure-by-design architecture and secure design principles encompassing all components and direct interfaces with EVs, EVSE, Charging Point Operators and E-Mobility Service Providers (EMSP) within the e-mobility ecosystem<sup>160</sup> considering governance models involving the roles and responsibilities of the different actors;
- Conduct a thorough threat analysis and risk assessment to identify potential security vulnerabilities within the ecosystem, also analysing the security of interfaces with all involved actors (e.g., EV Aggregators, Facility Managers, Flexibility Providers, Distribution System Operators, etc.) when applying V2X services;
- Define a comprehensive testing framework for penetration including reacting against live attacks to EVSE as well as to vehicle network on hardware (HW) and software (SW) components to uncover potential weaknesses and vulnerabilities, including behavioural aspects such as sub-standard repair or vehicle tampering;
- Implement a shared system of systems testing approach and develop co-designed verification and certification methods (also via Hackathon);
- Demonstrate in real-life operational environment the use of the framework for testing the cyber security and resilience of vehicles and charging infrastructure isolated and in connection to situations like charging, preparing for charging and payment processing;
- Compliance with existing standards<sup>161</sup> and best practices for security, resilience, and robustness of e-mobility systems for more secured systems should be ensured, making use, where applicable, of generative AI;
- Extend Public Key Infrastructure (PKI) deployment, while considering emerging cryptography threats (i.e., quantum crypto) and exploring solutions, particularly focusing on pre-emptive measures against Post-Quantum Cryptographic attacks;

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<sup>160</sup> The cyber security analysis for connected vehicles performed by the European Union Agency for Cybersecurity (ENISA) and Joint Research Centre (JRC) should be considered.

<sup>161</sup> Such as UNECE R155 or UNECE WP.29 (based on a ISO standard 21434), European CRA and the EC's PKI ecosystem governance and ISO15188-20, see also [Cyber Resilience Act Requirements Standards Mapping - Joint Research Centre & ENISA Joint Analysis — ENISA \(europa.eu\)](#)

- Support to the set-up and implementation of the EC's PKI ecosystem governance based on ISO 15118-20 standard;
- Develop digital twins to help define vulnerable elements of infrastructure and identify measures for risk mitigation;
- Consider the HW/SW elements and communication channels spanning from vehicles to charging stations and the electricity grid as a proactive design to mitigate vulnerabilities across the entire chain;
- Exploitation of synergies with projects related to the Software-Defined Vehicle of the Future<sup>162</sup> is encouraged where applicable.

This topic implements the co-programmed European Partnership on 'Towards zero emission road transport' (2ZERO). As such, projects resulting from this topic will be expected to report on the results to the European Partnership 'Towards zero emission road transport' (2ZERO) in support of the monitoring of its KPIs.

**HORIZON-CL5-2025-01-D5-03: Safe post-crash management of road Light Duty Battery Electric Vehicles (BEVs) (2ZERO Partnership)**

<b>Call: Cluster 5 Call 01-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 5.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 6 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the</p>

<sup>162</sup> See Call HORIZON-KDT-JU-2023-3-CSA-IA, HORIZON-CL5-2024-D5-01-05 and HORIZON-JU-Chips-2024-1-IA-T3

	Research and Training Programme of the European Atomic Energy Community (2021-2025). <sup>163</sup> .
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Expected Outcome: Project results are expected to contribute to all the following outcomes:

- Significant improvement of vehicle designs (especially the design of the most recent battery pack and its integration into the vehicle) from the perspective of fire-hazard reduction, fire suppression, crashworthiness and post-crash handling compared with the baseline vehicle, following specific design guidelines;
- Advanced BEV condition assessment methods and tools with a focus on the condition of the battery as the most critical sub-system, providing safety-relevant information in a standardised format useful for rescue, towing and after-treatment services, complementing the digital battery passport, ensuring the safety of workers in all these phases, minimising environmental hazards and easy to apply by practitioners – towards standardised procedures;
- Re-purposing/re-using/re-cycling of batteries from crashed BEVs facilitated by tailored interventions, high confidence in battery health condition and standardised handover protocols, thus supporting potential second-life applications of batteries from crashed BEVs;
- Best practices in fire handling and fire suppression, rescue procedures and handling of crashed Light Duty BEVs applied all over Europe, supported by training material and instructions for ‘first responders’, such as firefighters and emergency service workers;
- Dispelling safety concerns of (potential) BEV users as well as policy/decision makers by science-based communication and comparative statistics.

Scope: In addition to protection during a collision, it is the post-crash phase, immediately after the collision, that is crucial for the consequences of a road crash. Vehicle fires are a key concern in this post-crash phase. While there are many similarities to fires in vehicles with Internal Combustion Engines (ICEV), road electric vehicle battery fires pose a range of new challenges to emergency responders and everyone handling EVs post-incident, including tow, repair, storage, salvage & wrecking. The rescue of victims, the safety of first responders and safe, efficient, and timely firefighting measures are key factors. The latter in particular poses important challenges specific to road electric vehicles, amongst others due to the chemical composition of state-of-the-art lithium-ion batteries, the placement of the battery in the vehicles, enclosed in a water-tight, protective compartment, and the volume of water needed to cool a burning high-capacity battery. This is a challenge in particular in constrained spaces, such as in tunnels.

<sup>163</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

There is a need to support the definition of standards and procedures both in terms of risk but also in terms of response. With a focus on Light Duty Battery Electric Vehicles (BEVs), proposed actions will identify and further develop optimum technological solutions, processes and best practices towards future standards, design guidelines and official instructions / service regulations.

Proposals are expected to address **all** the following aspects:

- Vehicle health assessment tools after a crash, with a focus on the assessment of the battery and high-voltage system condition, ensuring that the HV battery is in a safe and stable condition (avoidance or early detection of thermal runaway after a collision), and maximising the likelihood of keeping the battery in service in the vehicle once fixed / re-using it, in line with the proposed regulation on circularity requirements, eco-design and end-of-life of vehicles. Both on-board monitoring systems and off-board systems can be considered;
- If making use of connectivity to on-board monitoring systems, the accessibility to the health and safety information / data needs to be addressed. This includes the development of state of safety and state of health algorithms to provide the remaining useful life and potential safety risks of the battery after a collision, complementing the information on the digital battery passport<sup>164</sup>;
- Extrication procedures protecting both crash victims and emergency service workers to the best possible extent, also considering the gender dimension. To ensure the effectiveness of fire handling, suppression, and rescue procedures for crashed BEVs, it is crucial to further develop these practices in close collaboration with first responders;
- Fire extinguishing techniques and firefighting procedures for BEVs (if the case also including innovative fire extinguishing media), considering the risks specific for EV including potential toxic products of the associated chemical reactions, as well as vehicle designs supporting firefighting. Particular attention should be paid to the design of the battery pack and its integration into the vehicle, including auxiliaries;
- Develop and implement procedures and tools for the safe handover, handling, transport and storage of crashed BEVs, with wide dissemination to relevant stakeholders towards standardised procedures;
- Quantify the rate and severity of BEV fire safety impacts by conducting a comparative study addressing aspects such as frequency of BEV fire and severity of outcome, and provide statistical analysis to deliver science-based communication on the safety of Light Duty BEVs to the general public

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<sup>164</sup> With regard to monitoring techniques and algorithms, proposals are expected to coordinate and exploit synergies with research topic HORIZON-CL5-2024-D2-02-04 on “Accelerated multi-physical and virtual testing for battery aging, reliability and safety evaluation” under the Batt4EU Partnership.

- Real-life demonstration (in comparison to the state-of-art) to include the demonstration of Light Duty (vehicle category M1 and N1) BEV condition assessment tools, data analysis, as well as firefighting, rescue, and handling procedures on a series production vehicle;

The project should actively seek interaction with and make use of results from workshops on EV fire safety currently being organised under the IEA HEV Technology Collaboration Programme, and where relevant with the Sustainable Transport Forum Task Force 6: “Developments for fire safe deployment of recharging points in covered parking garages”<sup>165</sup>.

The project should take account Open Science, its practices and learning, and the project’s results will be enacted in line with FAIR principles for data<sup>166</sup>.

This topic implements the co-programmed European Partnership on ‘Towards zero emission road transport’ (2ZERO). As such, projects resulting from this topic will be expected to report on the results to the European Partnership ‘Towards zero emission road transport’ (2ZERO) in support of the monitoring of its KPIs.

**HORIZON-CL5-2025-01-D5-04: Extended lifetime of road Battery Electric Vehicles (BEV) (2ZERO Partnership)**

Call: Cluster 5 Call 01-2025 (WP 2025)	
Specific conditions	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 7.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 7.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 5-6 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant</i>	The rules are described in General Annex G. The following exceptions apply:

<sup>165</sup> The Hybrid and Electric Vehicle Technology Collaboration Programme (HEV TCP) under the International Energy Agency (IEA) framework. <https://ieahev.org/tasks/49/>; The Sustainable Transport Forum (STF), Task Force 6 is in charge of “Developments for fire safe deployment of recharging points in covered parking garages” [https://transport.ec.europa.eu/transport-themes/clean-transport/sustainable-transport-forum-stf/active-sub-groups/sub-group-best-practices-public-authorities-support-deployment-recharging-infrastructure-regex\\_en](https://transport.ec.europa.eu/transport-themes/clean-transport/sustainable-transport-forum-stf/active-sub-groups/sub-group-best-practices-public-authorities-support-deployment-recharging-infrastructure-regex_en)

<sup>166</sup> Final Report and Action Plan from the European Commission Expert Group on FAIR Data, “TURNING FAIR INTO REALITY” - [https://ec.europa.eu/info/sites/info/files/turning\\_fair\\_into\\_reality\\_0.pdf](https://ec.europa.eu/info/sites/info/files/turning_fair_into_reality_0.pdf)

<i>Agreements</i>	Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). <sup>167</sup>
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**Expected Outcome:** Project results are expected to contribute to all the following outcomes:

- Holistic improved understanding of ageing and degradation of critical electric drive components relevant from a system integration point of view (fitting, mounts, connectors, sealings...) of Light Duty (vehicle category M1 and N1) BEV enabling user-centric designs for longer life and for higher residual values to minimise the environmental impact and to strengthen European resource sovereignty;
- 20 % higher residual value<sup>168</sup> through longer lifetime of BEV increasing material efficiency and productivity in comparison to baseline, state of the art vehicle;
- Future sustainable, economy-design concept evaluation for extended lifetime with minimum use of resources and re-use, recycle and End of Life (EoL) strategies applicable for advanced technology development;
- Advanced prospective/prescriptive maintenance and repair concepts to extend useful lifetime of BEV and minimise the used resources (20% reduction in resources in the use phase) and environmental footprint (5% reduction).

**Scope:** Currently, the value of a vehicle is mostly defined by driven mileage and age, underestimating the actual residual value. However, the real actual residual value of a BEV and its component should help implement Circular Economies (CE) strategies beyond classical shredding, such as reuse, remanufacturing, recovery of precious material. The residual value is determined by ageing and degradation in the use phase, repair and maintenance measures, operation of the vehicle and also by a CE-specific design. Consequently, prospective/prescriptive maintenance strategies, repairability and upgradability of vehicles must be addressed in relation to actual ageing and degradation of a component as part of upcoming CE strategies (including 9R approaches) to ensure longer (in terms of higher

<sup>167</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

<sup>168</sup> Reference UBA Study on “Illegal Treatment of End-of-Life Vehicles -Assessment of the environmental, micro- and macroeconomic effects”, <https://www.umweltbundesamt.de/publikationen/illegal-treatment-of-end-of-life-vehicles>, last visited 20.06.2024; the current additional revenue of an BEV (not considering materials and parts which are common with ICE) w/o the battery is estimated to be 120 € neglecting economic effects such as COVID. Correcting this one can assume that the electric drive train currently has a low residual value of » 250 € and the battery estimated to 2.000 €.

residual values) and more sustainable lifetimes of road BEV without over-sizing components and/or increasing the use of raw materials.

This topic focuses on the road BEV electric drive components relevant from a system integration point of view where high combined operational loads are to be expected, on the thermal management systems as well as on power electronics. The ageing and degradation of pack and module level is included whereas the battery cell level is excluded.

Proposals are expected to address **all** the following aspects:

- Analyse holistically the ageing and degradation of relevant, critical BEV functions and relevant sub-systems (excluding battery cells), that determine the Vehicle Lifetime and residual value under the aspect of functionality, safety and economic considerations (e.g., through correlating real-life operational loads with observed degradation and ageing effects);
- Develop tools and methods to assess, measure and predict ageing and degradation of relevant sub-systems (e.g. modelling combining multi-physical models describing ageing/degradations and vehicle operation and applying AI approaches, non-invasive evaluation to describe ageing and degradation over lifetime, multi-physical testing to accelerated occurrence of realistic ageing and degradation phenomena, use of novel sensors for measuring ageing and degradation in an electric drivetrain, etc.);
- Develop extended lifetime concepts and assess lifetime extension measures for BEV ensuring high residual values including right-sized design, operation, maintenance, refurbish and repair, by e.g. definition of prospective maintenance strategies, implementing ageing / degradation models into the design, advanced control strategies to minimise operational loads contributing to ageing and degradation phenomena including sensor technologies to obtain real-life operational data;
- For all relevant, critical components, proposals are expected to follow the “digital product passport” approach, to achieve maximum traceability<sup>169</sup>;
- Data management for operational loads, maintenance, and repair measures;
- Validation and demonstration of concepts and designs for higher residual values (less aging and degradation under operational conditions) appropriate to the TRL level via a full physical demonstrator of all components of the electric drive-in representative laboratory environment.

The project(s) should take account Open Science, its practices and learning, and the project’s results will be enacted in line with FAIR principles for data<sup>170</sup>.

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<sup>169</sup> The “Digital Product Passport” will provide information about products’ environmental sustainability. This information will be easily accessible by scanning a data carrier and it will include attributes such as the durability and reparability, the recycled content or the availability of spare parts of a product. [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_23\\_6257](https://ec.europa.eu/commission/presscorner/detail/en/ip_23_6257)

This topic implements the co-programmed European Partnership on ‘Towards zero emission road transport’ (2ZERO). As such, projects resulting from this topic will be expected to report on the results to the European Partnership ‘Towards zero emission road transport’ (2ZERO) in support of the monitoring of its KPIs.

**HORIZON-CL5-2025-01-D5-05: Road Battery Electric Vehicles (BEV) optimised user-centric solutions for energy efficiency design and consistent range throughout weather conditions (2ZERO Partnership)**

<b>Call: Cluster 5 Call 01-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 6.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 12.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>171</sup>.</p>

Expected Outcome: Project results are expected to contribute to all the following outcomes:

- Validated set of user requirements and usage acceptance limits, e. g. acceptable range loss for cabin climatisation, for different vehicle user groups (e. g. age, income, gender, location, regular usage models) in consideration of driving habits under various weather conditions as a basis for system development;

<sup>170</sup> Final Report and Action Plan from the European Commission Expert Group on FAIR Data, “TURNING FAIR INTO REALITY” - [https://ec.europa.eu/info/sites/info/files/turning\\_fair\\_into\\_reality\\_0.pdf](https://ec.europa.eu/info/sites/info/files/turning_fair_into_reality_0.pdf)

<sup>171</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

- Innovative and affordable Light Duty Vehicles (LDV) / Light Commercial Vehicles (LCV) energy management solutions demonstrated with a prototypical system (e. g. mock-up vehicle) in relevant environment and compared with State of the Art. Solutions should be cost effectively fulfilling and balancing user needs (from comfort and air quality aspects such as temperatures, humidity, CO<sub>2</sub>, to driving range) under extreme weather conditions (-15°C to at least +40°C, aiming to +45°C);
- User and use case specific vehicle range loss (due to climatisation needs) at extreme ambient conditions will be reduced to user acceptance limits. Compared to State of the Art for an affordable system design, the range loss from normal operating conditions (e.g., 10 to 20 °C) to extreme ambient conditions will be reduced by at least 30% without increasing system cost (e.g. energy, battery and thermal management);
- Optimal energy management including integration of future smart cities standards (e.g., speed control, environmental forecasting, swarm information, smart energy management, grid peak load periods) resulting in 10% improvement of energy demand for the thermal system and the powertrain.

Scope: Preserving the benefits of right-sized batteries in terms of road BEV affordability, material resource and energy savings while reducing the impact of occasional extreme weather conditions on driving range for both LDV and LCV, especially during longer trips, calls for novel systemic approaches on thermal management. Finding solutions which adequately balance user needs, technical effort and vehicle affordability requires user research (e. g. user acceptance, preferences, and usage scenarios for the vehicles) to set relevant goals and criteria for innovation in the field of thermal management systems and technologies.

Automotive standards (e.g. ISO 7730, ISO 14505-4) should be met, keeping in mind that extreme weather conditions are a critical challenge and should be tackled not only with innovative or improved components, but especially with novel, user-centric and intelligent solutions based on an overall vehicle system approach (can include interface to infrastructure) to minimise energy and simplify thermal systems and which do not lead to increased system or vehicle cost.

Proposals are expected to address **all** the following aspects:

- Analyse user requirements to identify personalised thresholds of thermal comfort and their different expectations and behaviours, sensitivities, tolerances, and acceptance with regard to various use cases;
- Establish a holistic approach to optimising energy efficiency and relevant thermal functions (system-oriented and simplified solutions based on usage scenarios and inclusion of external data to use energy optimally and avoid oversizing that could also result from cascading engineering safety margins);
- Explore and exploit the potential that connection to the grid offers without overloading the grid especially during extreme weather conditions;

- Develop innovative, safe and intelligent solutions that reduce the loss of range within acceptable limits also addressing the balance of costs, usage models and system complexity when considering extreme weather conditions while meeting automotive standards under normal use;
- Develop innovative vehicle energy management solutions for seldom extreme weather conditions also using predictive energy management, e.g., AI-based functions and intelligent management of auxiliaries, in order to fulfil user preferences and tolerances;
- All developed solutions and concepts must be integrated in a prototype or mock-up vehicle and demonstrated on system level in a relevant environment.

The project(s) should take account Open Science, its practices and learning, and the project's results will be enacted in line with FAIR principles for data<sup>172</sup>.

This topic implements the co-programmed European Partnership on 'Towards zero emission road transport' (2ZERO). As such, projects resulting from this topic will be expected to report on the results to the European Partnership 'Towards zero emission road transport' (2ZERO) in support of the monitoring of its KPIs.

**HORIZON-CL5-2025-01-D5-06: Strategies, tools and concepts for optimised road Battery Electric Vehicles (BEV) long-haul logistics use cases (2ZERO Partnership)**

Call: Cluster 5 Call 01-2025 (WP 2025)	
Specific conditions	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 5.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for</p>

<sup>172</sup> Final Report and Action Plan from the European Commission Expert Group on FAIR Data, "TURNING FAIR INTO REALITY" - [https://ec.europa.eu/info/sites/info/files/turning\\_fair\\_into\\_reality\\_0.pdf](https://ec.europa.eu/info/sites/info/files/turning_fair_into_reality_0.pdf)

	Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). <sup>173</sup> .
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Expected Outcome: Project results are expected to contribute to all the following outcomes:

- Accelerated uptake of Heavy Duty (HD) Battery Electric Vehicles (BEV) across the EU and Associated Countries, through innovative logistics models, addressing the need to optimise battery size and charging strategies across various logistics scenarios;
- Enhanced reliability and effectiveness of the road freight systems enabled by the development and implementation of software tools for decision making considering truck configurations, charging strategies, missions and efficient operational planning of routes and services, including charging and interoperable cross-border services;
- Increased portfolio of real-life HD-BEV operational demonstrations for long-haul and cross border operations and associated logistics models;
- Enhanced understanding of EU and Associated Countries stakeholders' needs for integrating HD-BEVs in logistics operations, also long-term novel usage models.

Scope: It is expected that by 2030 there will be around half a million of HD-BEV on European roads. Nonetheless, the current market application of these vehicles is largely confined to transport tasks with restricted range and considerable repetition. To expand their use, diverse strategies and applications must be explored and validated for scalability based on real data coming from logistics operators. The development of new application models should showcase the potential flexibility of HD-BEVs and assist end-users in establishing innovative usage frameworks and models.

Several actions are already underway for HD-BEV logistics (including the projects funded under the 2Zero topics HORIZON-CL5-2022-D5-01-08 and HORIZON-CL5-2024-D5-01-04) with a focus on extending range and charging capacity but also identifying challenges, gaps and impacts of HD-BEV usage in logistics operation. There is an urgent need to address these challenges and gaps for a smooth transition into daily operations and considering the wide variety of use cases and missions to be addressed.

Finding the optimal balance between the vehicle's configuration and available charging infrastructure for different logistics use cases is key to address the Total Cost of Ownership (TCO) challenge in the short and long term. This balancing will be enhanced by innovative logistics models and tools to further optimise logistics regional and long-haul operations in different regions in the EU and Associated Countries accelerating the deployment of HD BEVs for logistics.

<sup>173</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

Proposals are expected to address **all** the following aspects:

- Derive in-depth insights and lessons learnt from current long-haul transport missions in the EU and Associated Countries along major road arteries (e. g. the Trans-European Transport Network (TEN-T) corridors and nodes) towards overcoming the limitations determined by vehicle range and TCO and propose cost-effective HD BEV based logistics and operational models, building on modular vehicles set up and sound charging strategies. These models should include use cases across the EU and Associated Countries focused on long-haul transport missions and be based on existing, real operations data;
- Test and validate in real demonstrations new logistic operational concepts and models allowing a scalable deployment of HD-BEV in long haul transport missions optimising the different variabilities of a shipment (range, charging time, various European regions, drivers required break/rest times etc.).
- Develop and test associated digital tools for effective, robust integration in the overall logistics operations and fleets, and facilitating interoperable cross-border services – also developing where relevant digital twins to optimise concepts, models, solutions and operations;
- Real-life demonstrations should be based on existing fleets of operators (e.g. haulers, shippers, freight forwarders) with different categories of vehicles and missions. Demonstration should at least include 8 different types of long-haul missions in different climatic conditions, including cross-border missions, and involve several logistic companies and/or logistic users;
- Develop scenarios for optimum balance of vehicles' performance and configuration, charging strategies and solutions. The scenarios will include information on the distance dependency as a function of vehicle combinations, location and capacity of charging stations and payload demands;
- The demonstrated concepts, models and tools should allow strategies for firm upscaling of HD-BEV implementation, taking account the logistics operational models, the performance of complete vehicle combinations also considering the effects of on-board batteries on the ageing and energy recuperation;

The project(s) should take account Open Science, its practices and learning, and the project's results will be enacted in line with FAIR principles for data<sup>174</sup>.

This topic implements the co-programmed European Partnership on 'Towards zero emission road transport' (2ZERO). As such, projects resulting from this topic will be expected to report

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<sup>174</sup> Final Report and Action Plan from the European Commission Expert Group on FAIR Data, "TURNING FAIR INTO REALITY" - [https://ec.europa.eu/info/sites/info/files/turning\\_fair\\_into\\_reality\\_0.pdf](https://ec.europa.eu/info/sites/info/files/turning_fair_into_reality_0.pdf)

on the results to the European Partnership ‘Towards zero emission road transport’ (2ZERO) in support of the monitoring of its KPIs.

**HORIZON-CL5-2025-01-D5-07: Accelerating the transformation towards a circular automotive industry**

<b>Call: Cluster 5 Call 01-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 2.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 2.00 million.
<i>Type of Action</i>	Coordination and Support Actions
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Beneficiaries will be subject to the following additional obligations regarding open science practices: Open access to any new modules, models or tools developed from scratch or substantially improved with the use of EU funding under the action must be ensured through documentation, availability of model code and input data developed under the action.</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>175</sup>.</p>

Expected Outcome: Project results are expected to contribute to all the following outcomes:

- Widespread and shared understanding of circular economic principles with a harmonised approach across the full life-cycle value chain of road transport and beyond;
- Increased Europe’s resource sovereignty, lower the environmental footprint, and strengthen the competitiveness of the European automotive-full life-cycle value chain;

<sup>175</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/lst-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/lst-decision_he_en.pdf)

- Definition of requirements and boundaries for a European circular economy eco-system in the automotive sector also towards possible definitions of future standards;
- Increased development and adoption of product passports and digital twins, further optimising reuse and remanufacturing of all possible components, systems and sub-systems and vehicle recycling;
- A roadmap for highly visible and focused European Pilot Projects (lighthouses) is developed that drives the industrial transformation towards circularity at an accelerated speed in the European automotive-full life-cycle value chain.

**Scope:** Proposals are expected to address **all** the following aspects, focussing on end-of-life strategies:

- Identify stakeholders and industrial sectors and implement all needed measures for a direct involvement:
  - Support full life-cycle value chain stakeholder communities from European to regional levels;
  - Map ongoing projects and remanufacturing processes and analyse existing industrial strategies and roadmaps within the automotive value chain;
  - Design and implement a strong stakeholders' engagement process.
- Analyse the full life-cycle value chain eco-system, identify bottlenecks, gaps, and hurdles for transformation towards a circular automotive industry;
- Support the implementation and awareness of AI-based tools and processes for open and closed material, systems and component loops that can significantly increase the end-of-life value, the re-useability and re-cyclability "by design" of all vehicle components and materials also in other industrial sectors;
- Assess the economic, environmental and societal impact of a future circular automotive industry (e.g., business cases and investments, contribution to the environmental footprint and the Green Deal objectives, job creation, competitiveness...), and analyse possible viable business models along the full life-cycle value chain (9R principles), within a circular automotive industry;
- Support the conceptualisation of a possible future European Pilot Project (lighthouse) "Recycling Factory of the Future" including viable business models, also analysing the spillovers to other sectors, and outlining a pathway towards its possible implementation with all relevant stakeholders of the full life-cycle value chain;
- Define and develop possible future product passports and digital twins.

## Aviation

Proposals are invited against the following topic(s):

### **HORIZON-CL5-2025-01-D5-08: Next generation testing capabilities in strategic EU wind tunnels**

<b>Call: Cluster 5 Call 01-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 15.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 15.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 3-5 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>176</sup></p>

**Expected Outcome:** Project results should focus on new and adapted testing capabilities for next generation climate neutral aviation. Project results are expected to contribute to all of the following expected outcomes:

- Airframe transformative technologies, including airframe-propulsion integration;
- High aspect ratio and/or highly flexible unfuelled wing;
- Distributed hybrid/electric propulsion;
- Airframe and propulsion aeroacoustics;

<sup>176</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

- Further advancements of experimental simulation capabilities required for novel low-emission aircraft towards reducing further the lead times.

**Scope:** The new mission letter to Commission-designate for startups, research and innovation called for new long-term strategy to boost European Research Infrastructures, recognising the need to further strengthen the European research and technology linked to strategic facilities, as they can greatly contribute to the competitiveness of the European economy.

In parallel to ongoing research policy initiatives which aim to define the future EU landscape and funding programmes to support technology infrastructures, the advancement of science and technologies is necessary for the development of new and adapted testing capabilities. EU wind-tunnels is a prime example of such strategic capabilities towards climate-neutral aviation. The Horizon 2020 RINGO project has provided an analysis of needs, gaps and overlaps of European Aviation R&I Infrastructures in order to achieve Flightpath 2050 goals, while a recent internal effort has updated, refined and prioritised those findings.

The scope of this topic is focused on better understanding and further advancing critical technologies that require the update of relevant strategic EU testing capabilities. While new instrumentation and development of new testing procedures and digital tools is within the scope of this topic, other Research and Technology Infrastructure investments (i.e., buildings, auxiliary facilities, etc) fall outside of the scope.

The complexity of multi-disciplinary design and optimisation of future aircrafts requires extensive computational efforts, validated by wind-tunnel and propulsion testing. The scope of this topic is confined by strategic priorities and proposed aircraft concepts as defined in the updated Horizon Europe Clean Aviation Strategic Research and Innovation Agenda. Emphasis is placed on airframe and propulsion transformative technologies, including the integration of open fan architectures on the airframe, distributed hybrid/electric propulsion, high aspect ratio and highly flexible unfuelled wing (e.g. for LH<sub>2</sub> aircraft), boundary layer ingestion, ground effects in new aircraft architectures and aeroacoustics.

The projects should be aligned with the Fly the Green Deal vision and 2050 climate neutral aviation objectives and if possible, exploit synergies with other EU and National projects. In those cases that the participation of multiple testing facilities is required, the projects should also define and agree upon interfaces, common architectures and common data exchange formats.

**HORIZON-CL5-2025-01-D5-09: Next generation aircraft autonomy technologies for cockpit / pilot assistance applications**

<b>Call: Cluster 5 Call 01-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per</i>	The Commission estimates that an EU contribution of around EUR 3.50 million would allow these outcomes to be addressed appropriately.

<i>project</i>	Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 7.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 2-4 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>177</sup></p>

**Expected Outcome:** Project results should contribute to the European civil aircraft cockpit technology roadmaps on crew assistance/automation/autonomy, with focus to next generation aircraft autonomy technologies for cockpit / pilot assistance applications.

Project results are expected to contribute to at least two of the following expected outcomes:

- Increasing safety in cockpits, by providing to the crew's assistance new systems or functionalities. with new capabilities for new aircraft platforms, new Human Machine Interface concepts and technologies.;
- Contribution to the roadmap of cockpits digitalisation and autonomy, by conceiving new cockpit capabilities, allowing an enhanced Human-System Relation (new ways for the crews to interact or collaborate with the cockpit). Technological breakthrough could bring to future cockpits the development potential necessary to take up the challenges of the next decades;
- Increased efficiency of cockpits performances: reduction of size, weight and power consumption (SWaP) of systems and equipment, reduced total lifecycle costs, integration levels by reduced production times and, first-time-right delivery.

**Scope:** Next generation aircrafts will be even more digital and automated, with more interactive and automated cockpits. This will be even more reliant on automation evolution and it is expected to mitigate an always-increased complexity of aircraft systems and operations, ensuring safe and efficient operations. However, automation is also prone to

<sup>177</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

significant errors when misused or misunderstood, especially if this is combined with new aircraft platforms (incl. new systems/capabilities) or new types of operations.

The projects should develop new technology bricks in line with the aircraft concepts proposed in the updated Horizon Europe Clean Aviation Strategic Research and Innovation Agenda<sup>178</sup> and possibly exploit lessons learned from the H2020-CS2 Large Aircraft Disruptive Cockpit Demonstrator<sup>179</sup>. Synergies may also be sought with Horizon Europe SESAR Single Person Operations projects.

The technology bricks should be aligned with the needs of future aircraft generations and operations, new requirements, and cockpit philosophy of European aircraft integrators for the next generations of aircrafts, while they should be cyber-resilient and controlled by a single pilot and without the assistance of an on-board human co-pilot. Development of simulation tools, use of artificial intelligence models, human factors, and cost-benefit analysis (CBA) of various technical solutions is within the scope of the topic. Interfacing with the European Union Aviation Safety agency (EASA) on safety and new testing and certification processes as well as alignment with the EASA AI roadmap should be considered, if applicable.

The focus is on development of new technologies up to TRL 4, rather than on integration and demonstration.

## **Waterborne transport**

Proposals are invited against the following topic(s):

### **HORIZON-CL5-2025-01-D5-10: Innovative solutions for energy conversion and safety of low and zero-carbon fuels in waterborne transport (ZEWT Partnership)**

<b>Call: Cluster 5 Call 01-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 11.25 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 22.50 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 7 by the end of the project – see General Annex B. Activities may start at any TRL.

<sup>178</sup> <https://clean-aviation.eu/sites/default/files/2024-09/2024-Clean-Aviation-SRIA.pdf>  
<sup>179</sup> <https://cordis.europa.eu/project/id/807097/results>

<p><b>Procedure</b></p>	<p>The procedure is described in General Annex F. The following exceptions apply:</p> <p>Proposals are expected to clearly address only one of the following areas:</p> <ul style="list-style-type: none"> <li>• Fuel cell solutions are expected to deliver results that will reach a combined power output of at least 5 MW with energy supply provided by low and zero-carbon fuels;</li> <li>• ICEs solutions are expected to demonstrate a combined power output of at least 10 MW with at least 85% of the energy supply provided by low and zero-carbon fuels.</li> </ul> <p>To ensure a balanced portfolio covering both areas, grants will be awarded to applications not only in order of ranking but at least also to one project that is the highest ranked within each area, provided that the applications attain all thresholds (and subject to available budget). This will allow to fund at least one project under each area.</p>
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**Expected Outcome:** Project output and results are expected to contribute to all of the following outcomes:

- The waterborne industry will have near-to-market solutions for the safe integration and use of low and zero-carbon fuel power conversion systems as the main power source for vessels above 5,000 Gross Tonnage (GT), contributing to the decarbonisation of shipping and lowering its impact on the environment, with overall energy efficiencies at least 55% in shaft propulsion;
- Equipment manufacturers and ship owners will have access to a knowledge repository to support standardisation for using low and zero-carbon fuels and ensuring technical compatibility between the fuel and energy conversion system;
- Public authorities, port terminals and ship operators will have access to a knowledge repository to identify hazardous scenarios for low and zero-carbon fuels used in the demonstration and their potential impact in ports, including risk control options, as well as development of protocols for safe response operations in case of an accidental release of low or zero-carbon fuels;
- Contribution to the competitiveness and strategic autonomy of the EU waterborne sector, in line with the Communication on European Economic Security Strategy. The EU waterborne industry, including shipyards and equipment manufacturers will gain an increased competitive advantage due to the development of ship concept designs, namely through the use of innovative software demonstrating optimised integration of energy technologies;
- The workforce across the value chain, including on-board crews and port workers directly handling low and zero-carbon fuels and carrying bunkering operations, will gain

competences and certified training in bunkering operations and port authorities' authorisations.

**Scope:** The International Maritime Organisation (IMO)'s Greenhouse Gases (GHG) revised strategy of 2023 and the FuelEU Maritime Regulation have set ambitious goals to reduce the use of fossil fuels in waterborne transport. To that aim, maritime operators are working to replace the currently used engines with alternative power conversion systems that will allow the use of low and zero-carbon fuels for propulsion. Among all ship-types, the decarbonisation of long-distance shipping will rely the most on successful innovative solutions with high power outputs enabling the use of low and zero-carbon fuels as the main propulsion energy source. Apart from greenhouse gas emissions, other pollutants and harmful ship emissions (e.g., NOx, SOx, PM, etc.) coming from the fuel mix currently used in waterborne transport and from low and zero-carbon fuels need to be lowered and eliminated where possible to reduce the negative impact on human health and the environment, including biodiversity, water and air quality. Research challenges remain in the integration of powerful power conversion systems on-board. This topic aims to integrate and further develop various fuel cells and internal combustion engines (ICE) solutions suitable for waterborne transport running on low and zero-carbon fuels and scaling-up their technological maturity on-board. For fuel cells, research is still needed to integrate different types of high-power fuel cells. While the current power output using fuel cells is lower than using ICEs, the former is more efficient than the latter.

The two awarded proposals will be selected to be complementary, not demonstrating the same power conversion system and fuel solutions. Therefore, each of the awarded proposals should address one of the two following areas:

- Projects demonstrating fuel cell solutions are expected to deliver results that will reach a combined power output of at least 5 megawatts (MW) with energy supply provided by low and zero-carbon fuels;
- ICEs solutions are expected to demonstrate a combined power output of at least 10 MW with at least 85% of the energy supply provided by low and zero-carbon fuels.

Regarding GHG emission reduction, proposals will follow the provisions of FuelEU Maritime and the IMO GHG reduction strategy on fuel standards.

Proposals must address all the following aspects, noting that appropriate consideration should be given to selecting a suitable design approach:

- One full scale demonstrator of a vessel above 5 000 GT, showing the potential of integrated systems for 100% energy load provision under normal operations;
- The demonstrated solutions must identify their impact on air pollution, showing at least:
  - i) 90% reduction of NOx from IMO tier III;
  - ii) sulphur emissions below 90% and;
  - iii) a maximum of 5 mg/kWh of PM;

- Consider fuel flexibility and address cost impacts of energy efficiency, taking into account impacts on vessel CAPEX and OPEX plus the opportunity cost of increased power conversion and fuel storage size and mass;
- An innovative storage and handling solution on-board of ships and mixing of sustainable alternative fuels with sustainable or low carbon pilot fuels. ICEs solutions should demonstrate a reduction in the use of pilot fuels compared to solutions available on the market, aiming to avoid the use of pilot fuels altogether;
- Solutions must be developed and proven to prevent and mitigate slippage and fugitive emission factors related to the use of:
  - the low and zero-carbon fuels used;
  - the remaining non-sustainable fuel used.
- Demonstrate optimised integration of energy technologies with overall energy efficiencies from fuel energy to shaft propulsion of at least 55%, able to operate on low and zero-carbon fuels and close to zero direct pollutant and harmful ship emissions;
- Identification of specific gaps in standardisation linked to the integration of the technologies researched and development of a roadmap to gather and disseminate the relevant data in support of standardisation, including early communication and discussion with policy makers, industry and academic associations, the European Commission and other relevant bodies;
- Development of parameters ensuring technical compatibility between the fuel and energy conversion system;
- Provide quantitative and qualitative validated risk and safety assessments and risk control options, including setting of safety rules and distances for bunkering, linked to the use of low and zero-carbon fuels on-board and impact in ports. Develop protocols for safe response through detection and dispersion modelling (both marine and atmospheric). Evaluate the relevant human and organisational risk factors, defining personnel protective equipment and adequate response techniques and equipment;
- The plan for exploitation and dissemination of results must identify adequate business cases and provide a roadmap for the deployment of the proposed technology, including plans for scalability, commercialisation, and deployment. The proposals should identify opportunities and propose strategies for further market uptake under the Innovation Fund and complementary bunkering needs under CEF AFIF (Connecting Europe Facility – Transport Alternative Fuels Infrastructure Facility);
- Development of material (including model courses with minimum requirements and a timeframe for achieving them) for training, reskilling, and upskilling of seafarers and port operators to use the developed solutions and operational procedures, for instance by

leveraging the expertise and educational resources of leading training providers and universities;

- In addition to the full-scale demonstrator, proposals must also conduct 3 replication studies on the scalability and transferability of the proposed solutions in different ship types. These studies must demonstrate the viability of the new tools, methods and process required for the integration of the proposed solutions. The scope should include not just storage tanks, engines, or injection mechanisms but also virtual prototyping and hardware-in-the-loop testing for verification, especially for the (safety) automation systems. Impact on factors like load-steps, load acceptance, and vibrations must be also included, as to facilitate the design of high-performing, maintainable, and safe vessels must be taken into consideration;
- Development of relevant on-board after-treatment of specific pollutants sourced from low and zero-emission fuels (e.g., ammonia slip or N<sub>2</sub>O for ammonia or formaldehyde for methanol);
- Proposals including technologies such as on-board Carbon Capture and Storage (CCS) and/or Carbon Capture, Storage and Utilisation (CCUS) will not be excluded, however the costs of these equipment will not be eligible for EU funding;
- Proposals must justify the contribution of their objectives, results, intellectual property (IP) management and exploitation strategy to the EU added value creation and strategic autonomy throughout the supply and value chain, including competitiveness of the EU waterborne industry, enhancement of the EU's R&I capacity, technological know-how capabilities and human capital, and resilience of the EU industrial and manufacturing base. The justification must be in line with the EU's Economic Security Strategy (including Research Security) and notably, the guiding principle set on Article 3(a) of the COMMISSION RECOMMENDATION (EU) 2023/2113 of 3 October 2023 on critical technology areas for the EU's economic security for further risk assessment with Member States<sup>180</sup>. Proposals are encouraged to prioritise shipyards, equipment manufacturers and providers located and manufacturing in the EU and EEA.

Additionally, proposals are invited to prove the utilisation of big data and data science technologies to determine real-world references regarding ship performance, environmental impacts and maintenance needs of ships operating on low and zero-carbon fuels.

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<sup>180</sup> Identify and analyse vulnerabilities according to their potential impact on the EU's economic security and the degree of likelihood that the negative impact materialises. The analysis should identify the main types of threats and threat actors and should take into account geopolitical factors where relevant to assess the likelihood of negative impacts. It should also take into account, *inter alia*, the value chain of the technologies, the evolution of risks as well as relevant technological developments, including any chokepoints and expected future chokepoints, a mapping of the EU's relative position in each technology, including key players and elements of the EU's comparative lead; the global interconnectivity of the ecosystem of the technology, including in research and the supply chain for the technology.

This topic implements the co-programmed European Partnership on ‘Zero Emission Waterborne Transport’ (ZEWT). As such, projects resulting from this topic will be expected to report on results to the European Partnership ‘Zero Emission Waterborne Transport’ (ZEWT) in support of the monitoring of its KPIs.

**HORIZON-CL5-2025-01-D5-11: Demonstration of battery energy storage systems in existing and new vessels via novel energy storage and ship design concepts (ZEWT Partnership)**

<b>Call: Cluster 5 Call 01-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 7.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 15.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 7 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Procedure</i>	<p>The procedure is described in General Annex F. The following exceptions apply:</p> <p>To ensure a balanced portfolio, grants will be awarded to proposals not only in order of ranking but at least also to one proposal that is the highest ranked within the area of maritime vessel and at least also to one proposal that is the highest ranked within the area of inland waterway vessel, provided that proposals attain all thresholds (and subject to available budget).</p>

**Expected Outcome:** Project outputs and results are expected to contribute to all the following expected outcomes:

- Demonstrated 40% increase in fully electric long-distance autonomy for maritime vessels above 400 gross weight tonnage (GWT) or inland river vessels above 86 meters, using batteries as the primary energy source;
- Demonstrated innovative solutions in energy storage concepts, energy efficiency or rapid in-route charging;

- Measures to increase the connectivity between islands and their connections to mainland are proposed and modal shift of cargo from road to inland waterway transport is fostered by presenting solutions ready for practical deployment;
- Improved lifetime and safe use of batteries in waterborne transport by addressing the operation, degradation and failure modes associated with unique waterborne transport operating conditions;
- Contribution to the competitiveness and strategic autonomy of the EU waterborne sector, in line with the Communication on European Economic Security Strategy<sup>181</sup>. The EU waterborne industry, including shipyards and equipment manufacturers will gain an increased competitive advantage through the development of key and cost-effective solutions for high energy densities storage systems and battery electric ships.

**Scope:** Batteries are highly efficient carriers of renewable energy and their increased utilisation in various waterborne transport applications enables the decarbonisation and depollution of waterborne transport. Full battery-electrification is already being demonstrated for small and medium-scale vessels. This action aims to increase the range of fully-battery-electric operation of waterborne transport vessels on this range of size. Several EU-funded projects (like e-Ferry Ellen and FLEXSHIP) are working on battery-electric ships, which may be considered as baselines for the corresponding vessel types.

Proposals are expected to address all of the following aspects:

- Full scale demonstration of battery-electric operation of seagoing vessels over 400 GWT or inland river vessels above 86 meters, with a 40% increase in the vessel operating range with battery as the primary source of propulsion with respect to a 2024 state-of-the-art full electric baseline. The solutions should allow an operation range of at least 120 nautical miles (or equivalent, as appropriate for other applications) and be applicable to representative operating conditions of the chosen ship (maritime ships: appropriate sea states, inland waterway vessel: upstream and downstream operation on relatively free-flowing parts of major rivers). Proposed solutions can either be suitable for newbuilds or for retrofits on existing vessels. Project proposals must clearly indicate the baseline range, the expected range as an outcome of this project, and the corresponding operating conditions;
- Innovative measures for range extension, which should go beyond the simple scaling up of existing commercial battery systems to increase the range. Solutions must include one or more of the following:
  - New onboard energy storage system concepts enabling high energy-densities suitable for different waterborne applications;
  - Innovative onboard energy efficiency measures including but not limited to, thermal management, electrical architecture, high voltage electrical components, energy

<sup>181</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52023JC0020&qid=1687525961309>

management and energy modelling for optimal operation including weather routing, integration of photovoltaic panels, and wind-assisted propulsion, and improved vessel hydrodynamic efficiency;

- Concepts for extending the operating lifetime of batteries through advanced architecture, onboard monitoring, control, and analytics;
- Concepts for rapid in-route charging or battery replenishment while maintaining desired operating schedules. Fast charging and onshore power supply (OPS) concepts should adhere to the IEC/IEEE standards which are under development, and the consortium is expected to liaise with the technical committee in IEC/IEEE and converge technical solution with standard under development. Other solutions enabling intermittent in-route power transfer to vessels may also be demonstrated.
- Development of guidelines/recommendations for the safety assessment of the novel installations based on field testing. This should build on established safety guidelines and requirements such as the Guidance on the Safety of Battery Energy Storage Systems onboard ships (from the European Maritime Safety Agency – EMSA) and the requirements for fixed and swappable batteries on inland vessels (from the European Committee For Drawing Up Standards In The Field Of Inland Navigation – CESNI), as applicable, and contribute to their applicability to a wider scope of novel electrification solutions. Furthermore, recommendations for improving the guidelines and extending them to the demonstrated new battery installation solutions should be presented. Regulatory aspects for the pertinent safety-critical ship systems as well as fire safety solutions for the battery room should also be addressed;
- The proposal must include replication case studies showing the applicability of the developed solution under emulated conditions for at least two other waterborne applications. The studies should demonstrate the opportunities of the developed solution, including the conditions under which the target of 40% range extension can be achieved, and provide an outlook of how this can lead to further range extension in the future. These studies should pave the way for further exploitation and market uptake activities as requested in the following point;
- The plan for exploitation and dissemination of results must identify adequate business cases and provide roadmap for the replication and deployment of the proposed technology, including plans for scalability, commercialisation, and deployment. Proposals should identify and propose opportunities for further market uptake under the Innovation Fund and complementary bunkering needs under CEF AFIF (Connecting Europe Facility – Transport Alternative Fuels Infrastructure Facility);
- Development of material for training, reskilling and upskilling of seafarers and shore-based personnel to use the developed solutions, by leveraging the expertise and educational resources of leading training providers and universities;

- Proposals must justify the contribution of their objectives, results, intellectual property (IP) management and exploitation strategy to the EU added value creation and strategic autonomy throughout the supply and value chain, including competitiveness of the EU waterborne industry, enhancement of the EU's R&I capacity, technological know-how capabilities and human capital, and resilience of the EU industrial and manufacturing base. The justification must be in line with the EU's Economic Security Strategy (including Research Security) and notably, the guiding principle set on Article 3(a) of the COMMISSION RECOMMENDATION (EU) 2023/2113 of 3 October 2023 on critical technology areas for the EU's economic security for further risk assessment with Member States<sup>182</sup>. Proposals are encouraged to prioritise shipyards, equipment manufacturers and providers located and manufacturing in the EU and EEA.

Additionally, proposals are invited to prove the utilisation of big data and data science technologies to determine real-world references regarding ship performance, environmental impacts and maintenance needs of ships operating on low and zero-carbon fuels.

This topic implements the co-programmed European Partnership on 'Zero Emission Waterborne Transport' (ZEWT). As such, projects resulting from this topic will be expected to report on results to the European Partnership 'Zero Emission Waterborne Transport' (ZEWT) in support of the monitoring of its KPIs.

**HORIZON-CL5-2025-01-D5-12: Real-time, adaptative and innovative energy management solutions to optimise fuel consumption and lower emissions pollutants in waterborne transport (ZEWT Partnership)**

Call: Cluster 5 Call 01-2025 (WP 2025)	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 4.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Technology</i>	Activities are expected to achieve TRL 5-6 by the end of the project –

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Identify and analyse vulnerabilities according to their potential impact on the EU's economic security and the degree of likelihood that the negative impact materialises. The analysis should identify the main types of threats and threat actors and should take into account geopolitical factors where relevant to assess the likelihood of negative impacts. It should also take into account, *inter alia*, the value chain of the technologies, the evolution of risks as well as relevant technological developments, including any chokepoints and expected future chokepoints, a mapping of the EU's relative position in each technology, including key players and elements of the EU's comparative lead; the global interconnectivity of the ecosystem of the technology, including in research and the supply chain for the technology.

<i>Readiness Level</i>	see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>183</sup>.</p>

**Expected Outcome:** Project results are expected to contribute to all the following outcomes:

- Ship operators will benefit from the use of Artificial Intelligence (AI), using techniques such as Machine Learning (ML) and Machine Reasoning, and improved instrumentation, as well as on monitoring and control systems to optimise ship operations, while integrating new fuel types, power conversion systems, propulsion and heat systems, wind-assisted propulsion, and other energy efficiency solutions;
- Improved supervision, forecasting, and real-time control of the full spectrum and complexity of ship energy needs and flows, according to the variety of operation profiles (i.e., ship energy dynamics, varying -especially low- water levels);
- Development of adaptable real-time optimisation strategies to accommodate expected and unforeseen operational conditions;
- Improved calibration and certification of sensing systems, including low-cost innovative real-time sensors, to support the enforcement of Greenhouse Gas (GHG) emissions reduction, as well as SOx and NOx emissions regulatory framework, both at a European (e.g., Sulphur Directive, NRMM Regulation) and international level (e.g., MARPOL Annex VI), as well as the reduction of emissions of any other relevant harmful emissions, leading towards common operational procedures, methodologies and reporting;
- Improved ship design concepts including lessons learnt from energy efficiency optimisation, considering various parameters that influence ship performance under diverse operational conditions (e.g., wave characteristics, wind strength, hull biofouling growth rate, low water levels/droughts).

**Scope:** Energy Management Systems (EMS) have the potential through adaptive control, ML and AI to optimise energy demand and minimise harmful emissions. This paradigm shift will also lead to increase vessel efficiency through pioneering assessments and optimised

<sup>183</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

integration of groundbreaking power conversion and energy storage systems, Waste Heat Recovery (WHR) systems, machinery prognostics and system simulations, variable speed electric motors, and both centralised and modular energy micro-grid architectures. In parallel, such advancements allow for real-time exhaust gas monitoring, including particulates, SOx, NOx and GHG emissions, which could be integrated into the overall monitoring and adaptive control.

Proposals are expected to address all the following aspects:

- Development, adaptation, and integration of real-time monitoring solutions for continuous mapping of ship operating profiles, energy flows, Greenhouse Gas (GHG) emissions, as well as SOx, NOx and other polluting emissions (e.g., emissions from methane slip), including the assessment of potential ammonia environmental footprint;
- Development of advanced monitoring, supervision and forecasting models, by capitalizing on AI and ML capacities for real-time data analysis and feedback, considering both internal and external data sources; comprehensive machine learning and machine reasoning models should enable intelligent vessel performance monitoring and supervision, vessel operation optimisation and planning;
- Design of centralised or modular ship energy architecture, including micro-grid architectures, applicable to a variety of commercial ship types, and adaptive energy management systems to improve the overall vessel energy efficiency, through energy demand reduction and energy supply efficiency;
- Showcase the flexibility of the adaptive energy management system using simulation methods for different vessels having various propulsion system types, operating in a wide range of environmental conditions;
- Assessment of design, including retrofitting, and operational measures and controls by focusing on three (3) complementary case studies, on, Inland Waterways Transportation (IWT), coastal shipping and Deep-Sea Shipping (DSS), aiming at maximising vessel efficiency, in the context of designing for efficiency.

This topic implements the co-programmed European Partnership on ‘Zero Emission Waterborne Transport’ (ZEWT). As such, projects resulting from this topic will be expected to report on results to the European Partnership ‘Zero Emission Waterborne Transport’ (ZEWT) in support of the monitoring of its KPIs.

#### **HORIZON-CL5-2025-01-D5-13: Novel holistic intelligent tools for variable retrofit and decarbonised scenarios (ZEWT Partnership)**

<b>Call: Cluster 5 Call 01-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU</i>	The Commission estimates that an EU contribution of around EUR 4.00

<i>contribution per project</i>	million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 4.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>184</sup>.</p>

**Expected Outcome:** Project outputs and results are expected to contribute to all the following expected outcomes:

- Novel holistic intelligent tools for variable retrofit scenarios and new operational modes will be developed and then demonstrated by the application to a retrofit ship test case;
- Measures to overcome the limitations of current generation of design tools will be proposed which currently do not account for the interferences and mutual influences among the various retrofit systems installed on board;
- Contribution to the retrofitting of existing aging fleets in the EU;
- Increased competitiveness of European shipyards, marine equipment providers and repair yards in the maritime green technology sector through the development of cost-effective solutions, that support ship-owners in making the European fleet climate neutral and still competitive;
- Accelerated regulatory approval processes, best practice guidance, and easy-to-customise strategies for retrofitting by reducing the commercial risk of deployment for ship owners.

**Scope:** In the quest to get energy reductions from retrofitting, new design requirements and constraints are emerging, e.g., due to the introduction of new low-carbon fuels, and new

<sup>184</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

added propulsion systems (e.g., wind assisted systems). Furthermore, other technical measures are not yet “standardised” for retrofitting existing ships, due to other difficulties or high costs.

There is also a lack of design/retrofitting experience in applying these new solutions. A practical example is the space rearrangement in the electrification of the ship, including the installation of heavy battery sets, a solution that uses space: but changing ship’s volume and weight distribution along the beam might have a strong effect on the dynamic stability of the vessel.

The realisation of *ad-hoc* web tools and guidelines to help with the retrofit task is currently under development, based on the limited number of new small-scale demonstrators within ongoing projects (e.g., Green Marine, RETROFIT55, etc.).

These approaches combine mature and new technologies creating a decision-support system (DSS) that integrates these solutions. However, even if the final results have not been delivered yet, these projects are considering the retrofit problem in a silo-based mode, that is not including a full multidisciplinary design optimisation with the mutual interactions among the technologies. This might lead to difficulties in achieving overall optimal goals, therefore *resulting in a limited impact* on the transition to zero-emission waterborne. These simplified strategies are indeed not accounting, in a full coupled mode, for the *interferences* and *mutual influences* among the different retrofit systems installed on board (i.e. available space and payload, safety constraints, electrical constraints, etc.): in other terms, they are not considering the *global problem* of retrofitting in a *holistic* way, which is a major objective of this call. Also, the holistic intelligent tools could explore possibilities for modular or serial solutions which reduce costs of retrofitting.

Furthermore, in the short and medium term we are and will be observing multiple ongoing regulatory processes (by IMO, EU, UNFCCC, ES-TRIN) developing frameworks and standards that will shape waterborne transport in the next decades. This further element of variability, i.e. the uncertainty in decarbonisation ambitions as well as on the variability in cost and availability of carbon-neutral fuels, not considered yet in the current approaches, claim for a large effort for new holistic retrofit intelligent design tools for exploring multidisciplinary solutions in variable decarbonisation scenarios.

Innovative holistic intelligent design tools, with a multi-objective strategy and AI simulators, have to be developed rapidly and tested if we want to significantly contribute to the transition to zero-emission waterborne transport, and this has to be done by integrating the many sectors involved in the design.

Proposals must address all the following aspects:

- The development of a novel intelligent design digital tool which can fully integrate decarbonising concepts (e.g., alternative fuel propulsion systems, auxiliary propulsion systems, renewable energy sources, etc.) and can be used for retrofit concepts;

- The design digital tool must have the capability of considering together multiple decarbonisation solutions for operating vessels, accounting for reciprocal influences, and must be able to integrate existing loading instrument (software or data package) for stability, weight and hull strength control;
- Retrofit configurations might include changes in operational modes (e.g., slow steaming, weather routing, etc.) which should also be evaluated against human and organisational risk factors introduced;
- The design tool must include a life-cycle perspective from design to scrapping;
- Preliminary (intermediate) validation of the design tool by testing at model scale original versus refitted ship solution, also assessing the environmental impact of the solutions, including on biodiversity, air quality and noise;
- Final demonstration, applying the tool in six virtual demonstrations, one for each one of the six ship types detailed in the Strategic Research and Innovation Agenda of the Zero-Emission Waterborne Transport Partnership, considering together multiple decarbonisation solutions and producing final optimised refitted designs to be tested in operational environment conditions with a given operational profile. Participation of ship owners and operators to these virtual demonstrations should be ensured to pave the way to further market deployment of the solution and real retrofitting operations.

This topic implements the co-programmed European Partnership on ‘Zero Emission Waterborne Transport’ (ZEWWT). As such, projects resulting from this topic will be expected to report on results to the European Partnership ‘Zero Emission Waterborne Transport’ (ZEWWT) in support of the monitoring of its KPIs.

**HORIZON-CL5-2025-01-D5-14: Flexible and mobile solutions for Onshore Power Supply (ZEWWT Partnership)**

<b>Call: Cluster 5 Call 01-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 5.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 8 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial</i>	The rules are described in General Annex G. The following exceptions

<i>set-up of the Grant Agreements</i>	apply: Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). <sup>185</sup> .
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Expected Outcome: Proposals must cover one of the following outcomes:

- Port authorities and ship operators will have fully flexible and mobile solutions to ensure that onshore power supply (OPS) can be provided within and across different terminals and port areas maximising operational benefits for port authorities, terminal and ship operators, optimising deployment or;
- Port authorities will have available solutions to provide OPS at anchorage areas to different vessel types and different port environments in different conditions (physical and operational) to optimise OPS deployment and investments.

In addition, project outputs and results are expected to contribute to all of the following expected outcomes:

- Ship and port operators will benefit from cost-efficient innovative solutions for flexible and mobile OPS for ships at shore or OPS at anchorage areas, for Low and High Voltage installations beyond the deployment actions taking place to meet the requirements of FuelEU Maritime and AFIR set by 2030, towards the policy goals set by 2050.
- Terminal and ship operators will have available mature mobile and flexible OPS or OPS at anchorage solutions applicable to the different ship types and services and port environments, with a special consideration to safety explosive atmospheres and dangerous zones;
- Ship and port operators will have standards, protocols and/or solutions aiming to bridge the gaps identified during the project for the implementation of mobile and flexible OPS or OPS at anchorage areas;
- Ship operators, grid managers and energy suppliers will have solutions to prevent electrical failures and for earthing monitoring, with a particular focus on OPS mobile and flexible solutions or OPS at anchorage areas.

Scope: OPS solutions currently available in the market, while conforming to standards, have gaps in terms of flexibility and modularity, in particular regarding the expected future demand

<sup>185</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

in terminals with a high turnover of diverse waterborne traffic served. OPS port infrastructure solutions so far are static or have limited flexibility at the berth, whereby several static connections are needed to cover port requirements. As an alternative or supplement, further research is needed in OPS solutions that allow OPS to be provided within and across different terminals and port areas. Solutions developed under this topic should be generally applicable, so they can be used for several types of vessels. However, the solutions should consider the special features of the different ship types and services, such as the safety requirements for tanker and chemicals traffic where connectivity in complex environments is an issue.

Following Fit-for-55 OPS requirements in AFIR and FuelEU Maritime, new Onshore Power Supply products are being developed, including High-Voltage OPS systems, within a framework of robust standardisation. However, further research is needed on the mature, flexible and safe provision of OPS at anchorage and in a flexible way along different terminals and port areas through technologies other than barges, applicable to a wide range of ports with different geographies and conditions.

The development of solutions to simultaneously provide OPS, fast battery charging as well as loading operations needs further standardisation and dedicated protocols. Standardisation of fast battery charging is underway; therefore, proposals are encouraged to explore relevant research for fast battery charging beyond the current or soon to be adopted standards (e.g., IEC/IEEE 80005-4) to be implemented in the developed solutions for OPS at anchorage or mobile and flexible OPS.

Proposals must address all the following aspects:

- Demonstrate innovative scalable OPS solutions either:
  - At anchorage areas or;
  - Mobile and flexible solutions that allow for OPS to be provided within and across different terminals and port areas, for Low/High Voltage and with zero direct emissions, addressing a broad variety of ships in a flexible way.
- Minimise the risk of system failure and ensuring continuous operation, resilient to adverse climate conditions;
- Identify remaining gaps in standardisation for the solutions developed and define recommendations for standards, protocols and/or solutions at least for safe fast battery charging. Projects demonstrating mobile and flexible solutions on shore must also address these activities for load/unload cargo operations simultaneously;
- Research into systems that can simultaneously provide fast battery charging and OPS;
- Development of earthing protection solutions through monitoring of the grounding resistance to predict failure;

- All solutions must align with the optimisation of onboard High Voltage transformers, automation of onboard connection systems, optimisation of onboard OPS switchboard operation, and onboard safety monitoring systems and blackout prevention/mitigation systems to synchronise process and the communication between ship and shore;
- Adequate training and support for crew and port staff are crucial for the successful implementation and operation of the solutions developed training programs should encompass system operations, maintenance procedures, safety protocols, and emergency response protocols to ensure safe and efficient operations.

This topic implements the co-programmed European Partnership on ‘Zero Emission Waterborne Transport’ (ZEWT). As such, projects resulting from this topic will be expected to report on results to the European Partnership ‘Zero Emission Waterborne Transport’ (ZEWT) in support of the monitoring of its KPIs.

**HORIZON-CL5-2025-01-D5-15: Optimal integrated onboard renewable energy solutions, by considering wind-powered and hull performance technologies (ZEWT Partnership)**

Call: Cluster 5 Call 01-2025 (WP 2025)	
Specific conditions	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 7.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 7.50 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.

**Expected Outcome:** Project results are expected to contribute to all of the following expected outcomes:

- Development and demonstration of a standardised methodology for monitoring, recording and verification of energy used from Wind Assisted Propulsion devices directly into ship propulsion. The methodology is expected to allow integration of wind energy used in propulsion of ships directly into calculations of GHG intensity of the energy used on-board, both in context of Fuel EU maritime and International Maritime Organization (IMO) Life Cycle assessment (LCA) guidelines;
- Provision of a standardised framework to ensure certainty in the claims regarding fuel, Greenhouse Gas (GHG) and other polluting emission reduction by Wind-Assisted

Propulsion (WAP) systems, strengthening the implementation of the FuelEU Maritime Regulation;

- Uniform rules, regulations, assessment criteria, and sea-trial procedures for WAP solutions are explored and established, facilitating the market uptake of WAP systems;
- Standardisation efforts to implement the IMO Life-Cycle Assessment (LCA) guidelines are supported;
- Market uptake of WAP systems into existing vessels in the coming decade is facilitated, by introducing a set of standardised design alternatives and criteria for decision-making, as part of a standardised framework;
- Concerns about the safety and operational impacts on ships, port and other land infrastructure are addressed, as well as the lack of market confidence in the technology;
- Contribution to the competitiveness and strategic autonomy of the EU waterborne sector, in line with the Communication on European [Economic Security Strategy](#). The EU waterborne industry, including shipyards and equipment manufacturers will gain an increased competitive advantage through the development of key and cost-effective solutions for WAP systems.

**Scope:** WAP systems (e.g., rotor sails, rigid wing sails, soft wing sails, ventilated foil system, etc.) have gained significant attention as means of reducing ship fuel consumption, and GHG and other emissions, while they are also considered as primary means of propulsion for future newbuilt cases. Several ongoing EU-funded projects are already working on WAP systems with focus on holistic optimised ship design, control, and operation, including changes in conventional propeller propulsion, and focused on Deep Sea Shipping (DSS). However, there is still a variety of barriers and challenges that need to be addressed; the main challenges are to provide certainty on emission saving performance, define standards, while also facilitating WAP retrofitting. The aim of the topic is to develop a methodology that will allow to quantify and monitor the real impact of WAP systems into ship propulsion.

Proposals are expected to address all of the following aspects:

- Demonstration of at least one full scale WAP solution and its management and monitoring on-board. This demonstration will be used to also validate the methodology for integration of the energy provided by the WAP devices to the ship propulsion;
- Develop a holistic framework for the design optimisation for wind-assisted propulsion, either as a means of enhanced energy efficiency, or primary propulsion solution; the framework should work as design tool to facilitate the industry uptake of WAP technologies by introducing tailor-made solutions for various ship types, based on their operational profiles and navigation routes;
- Use of systems for advanced monitoring of energy consumption, performance optimisation, energy savings, mitigation of GHG and other polluting emissions. The

project should make optimal use of state-of-the-art sensor and digital technologies with a view to achieve continuous monitoring of energy made available from WAP devices; methodology should cover various types of WAP and should be applicable for all types of ships and operations;

- Assessment of environmental and wider benefits, including reduced emissions of air and water pollutants, underwater noise, biodiversity as well as cost-effectiveness for either standalone WAP solutions or combinations with other low and zero-emission technologies and/or energy efficiency measures;
- Focus on safety and operational aspects, for addressing any technical and operational challenges that may arise from the introduction of WAP systems – and possible combinations with other energy efficiency solutions – for ships and ports, including other land infrastructure;
- Addressing scalability and adaptability issues to the existing fleet, such as efforts to promote the standardisation of the different solutions, and application of the solution considering the real environmental conditions and the impact of climate change in wind patterns;
- Examine a variety of business cases and propose a number of market measures to address the lack of market confidence in WAP solutions and the uptake of such systems in the maritime industry.

Proposals are expected to explain the contribution of their objectives, results, IP management and exploitation strategy to the EU added value creation and strategic autonomy throughout the supply and value chain, including competitiveness of the EU waterborne industry, enhancement of the EU's R&I capacity, technological know-how capabilities and human capital, and resilience of the EU industrial and manufacturing base. The explanation must be in line with the EU's Economic Security Strategy (including Research Security) and notably, the guiding principle set on Article 3(a) of the COMMISSION RECOMMENDATION (EU) 2023/2113 of 3 October 2023<sup>186</sup> on critical technology areas for the EU's economic security for further risk assessment with Member States. Proposals are encouraged to prioritise shipyards, equipment manufacturers and providers located and manufacturing in the EU and EEA.

This topic implements the co-programmed European Partnership on 'Zero Emission Waterborne Transport' (ZEWWT). As such, projects resulting from this topic will be expected

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<sup>186</sup> Identify and analyse vulnerabilities according to their potential impact on the EU's economic security and the degree of likelihood that the negative impact materialises. The analysis should identify the main types of threats and threat actors and should take into account geopolitical factors where relevant to assess the likelihood of negative impacts. It should also take into account, *inter alia*, the value chain of the technologies, the evolution of risks as well as relevant technological developments, including any chokepoints and expected future chokepoints, a mapping of the EU's relative position in each technology, including key players and elements of the EU's comparative lead; the global interconnectivity of the ecosystem of the technology, including in research and the supply chain for the technology.

to report on results to the European Partnership ‘Zero Emission Waterborne Transport’ (ZEWWT) in support of the monitoring of its KPIs.

**HORIZON-CL5-2025-01-D5-16: Support of the new EU renewable and low carbon fuel ecosystem for waterborne transport**

<b>Call: Cluster 5 Call 01-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 2.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 2.00 million.
<i>Type of Action</i>	Coordination and Support Actions
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>187</sup></p>

Expected Outcome: Project’s results are expected to contribute to all the following expected outcomes:

- EU Fuel producers, fuel infrastructure developers and bunkering facilities will jointly benefit from the creation of relevant business models that will accelerate the deployment of renewable and low carbon fuels for waterborne transport.
- EU Fuel producers will become more competitive in the production of renewable and low carbon fuels for waterborne transport.
- Significant increase of pipeline projects supported by various programmes and institutions in relation to renewable and low carbon fuels production and usage.

<sup>187</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

- Developing a diverse portfolio of scientifically sound mature proposals for the deployment of technological solutions to reduce Greenhouse Gas emissions, in line with the EU climate targets, especially taking into account the Fitfor55 package.
- Added value creation and increased competitiveness within the EU waterborne transport fuel ecosystem.

Scope: The European Commission is currently involved in several initiatives that aim to accelerate the deployment of solutions relevant for the market uptake of renewable and low carbon fuels. Firstly, following the initiative from the Commission, the EU has adopted FuelEU Maritime Regulation, which sets the binding reduction targets for GHG intensity of energy used on board for maritime vessels. As a flanking measure to this regulation, the Commission has promoted the Renewable and Low Carbon Fuel Alliance, which encompasses a large portion of all fuel producers, with the goal to facilitate the investment in renewable and low carbon fuels for waterborne and aviation, aiming to clarify feedstock availability, demand, and supply forecast, and to promote a commercial pipeline of projects.

The Revised ETS directive has put shipping under the umbrella of ETS with corresponding revenues to be allocated to green shipping projects. Consequently, the Commission is preparing the first dedicated calls under the Hydrogen Bank, focusing on maritime applications.

In the context of international collaboration, the Commission is currently working, together with the Joint Research Center, on a study about the Global Gateway Green Shipping Corridors (GGGSC). This report aims to identify ports outside of the EU of strategic interest to the bloc that can be part of such corridors and to aggregate them into corridors that meet a combination of policy priorities. In this context, the Commission will also look into possible actions to support partner countries to ensure the availability of renewable and low carbon fuels within the selected ports.

In addition, the Commission has published a number of studies, including on the “Development of outlook for the necessary means to build industrial capacity for drop-in advanced biofuels”<sup>188</sup> and has published a call for a second tender for a study on “How to mobilize industrial capacity building for advanced biofuels”<sup>189</sup>. The EIB published the study [“Financing sustainable liquid fuel projects in Europe: Identifying barriers and overcoming them”](#) in May 2024. In addition Horizon Europe includes a call “[HORIZON-CL5-2024-D3-02-13: Support to the activities of the SET Plan Key Action area Renewable fuels and bioenergy](#)”, with deadline in February 2025. Advanced biofuels are also an option for renewable energy supply in waterborne transport. Furthermore, under topic HORIZON-CL5-2023-D2-01-07: Support for the deployment of R&I results for climate mitigation, five coordination and support actions have been selected. Synergies should be drawn in relation with the Innovation Fund program.

<sup>188</sup> [Development of outlook for the necessary means to build industrial capacity for drop-in advanced biofuels - European Commission \(europa.eu\)](#)

<sup>189</sup> Call for tenders CINEA/2024/OP/0005 STUDY ON HOW TO MOBILIZE INDUSTRIAL CAPACITY BUILDING FOR ADVANCED BIOFUELS

Projects are expected to take the previous initiatives as a starting point and go beyond their conclusions. In particular, they must address all of the following aspects:

- Provide project development support to at least 20 proposals<sup>190</sup> within the renewable and low carbon fuel ecosystem for waterborne transport in order to increase the number of applications in programmes such as Horizon Europe and its successor, Innovation Fund, CEF AFIF and schemes such as EIB Loans, structural funds, as well as initiatives at national and regional level and at international level within the Global Gateway strategy. The proposal should consider coordination of their activities with already existing EU project assistance providers such as the EIB Advisory project development assistance scheme, avoiding duplication. Proposals will propose KPIs in relation with additional projects and activities to be performed thanks to its action. The support to projects should be provided following a competitive selection process, prioritizing projects admitted to the RLCF Alliance Project Pipeline and/or Global Gateway. The proposal shall elaborate on project selection methodology.
- Creation of an analytical financial tool which allows users to model a project and understand the economic rational of a business case and identify those assumptions, drivers and barriers which are critical to ensuring that the underlying projects are financially and economically viable. The projects for which the analytical tool will be developed are those which produce renewable and low carbon fuels necessary for the sustainable goals of the waterborne transport sector, as defined in the Green Deal, especially by ensuring a wide European geographical coverage in the EU. These models must take into account the results delivered through the Roundtable 4 of the RLCF Alliance in their financial analysis. The models will aim to preserve the industrial competitiveness of the EU industry, in alignment with RED, FuelEU maritime and ETS, also considering any potential unlevelled playing field risks/challenges vis-a-vis other countries outside the European Union. These models will examine the scalability potential of the fuel considering production, transport and distribution, security of supply in ports in and outside Europe, GHG emission saving on Well to Wake basis, distance continuously sailed on the fuel, size of ship in terms of installed power, total distance sailed and transparency on the project costs. Additionally, these models will also aim to leverage potential synergies between RFNBOs and advanced biofuels technologies development should be identified and utilized for the benefit of both pathways. Appropriate linkage to the RLCF Alliance is encouraged.
- In collaboration with the RLCF Alliance, develop and conduct a series of workshops/trainings with financial institutions and relevant waterborne stakeholders to facilitate the market uptake of waterborne and renewable and low carbon fuel production solutions for waterborne transport, with a particular attention to the access to capital for demonstration projects with a higher technological risk profile and dissemination of best practices to access financing and funding. The project will need to carry out relevant

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Individual proposals will not be considered public deliverables to ensure full confidentiality

dissemination activities to communicate the results of the project to all relevant policy makers as well as stakeholders from the industry and civil society.

### **Transport-related health and environment**

Proposals are invited against the following topic(s):

**HORIZON-CL5-2026-01-D5-17: Real time monitoring of regulated and non-regulated emissions from all types of vessels and other port activities in order to enforce emission limits in waterfront cities**

<b>Call: Cluster 5 Call 01-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 8.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 0.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Admissibility conditions</i>	<p>The conditions are described in General Annex A. The following exceptions apply:</p> <p>The page limit of the application is 70 pages.</p>
<i>Eligibility conditions</i>	<p>The conditions are described in General Annex B. The following exceptions apply:</p> <p>At least one of the ports must be situated in a city participating in the Climate-Neutral and Smart Cities Mission. The proposed activities should feed into the implementation of the city's Climate City Contract (CCC), with abatement measures and port-city collaborative governance approaches to match or enhance CCC commitments. The demonstration activities must take place in a real operational environment.</p>
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Grants awarded under this topic will be linked to the following action(s):</p> <p>HORIZON-MISS-2021-CIT-02-03</p>

	<p>Collaboration with the Cities Mission Platform is essential and projects must ensure that appropriate provisions for activities and resources aimed at enforcing this collaboration are included in the work plan of the proposal. The collaboration with the Mission Platform must be formalised through a Memorandum of Understanding to be concluded as soon as possible after the project starting date.</p>
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**Expected Outcome:** To support the Zero Pollution Action Plan and the Smart and Sustainable Mobility Strategy as well as the implementation of the Climate-Neutral and Smart Cities Mission, project results are expected to contribute to all of the following expected outcomes:

- Real-time demonstration of on-board tamper-proof and remote measurement techniques for a wide range of pollutants (including pollutants from alternative fuels and non-regulated pollutants) from vessel emissions, allowing shipowners to measure the emissions during operation and contributing to the current monitoring and enforcing activities of public authorities, such as port and maritime authorities and with the potential to be used for future compliance monitoring;
- Development of broadly accepted harmonised methods to measure real sailing emissions, including coastal, open seas and inland waterway with potential to be used for future compliance monitoring;
- Development of an automatic reporting and verification system solution that helps shipping companies to comply with current and future regulation and for maritime, inland and port authorities to monitor and control the actual ship emissions derived from the data exchanged;
- Contribution to the delivery of better emission factors for emissions inventories and projections, especially for harmful substances and fuel mixtures for which little knowledge exists today and ultimately contributing to the establishment of a broadly accepted method for measuring and calculating real sailing emissions of a ship;
- Identification of real-world releases of harmful substances which are currently not controlled by regulations and excessive releases of substances already controlled in open seas and in-port activities;
- Innovative technologies and systems to monitor, measure and identify the source of pollution in ports beyond vessels, including other transport modes, port operations and industries active in the port environment are made available for public authorities;
- Recommendations for improved certification and testing to better cover real world situations;
- Support of local, regional, national and international emissions reduction and air quality plans and noise action plans by providing real-world emission information and

measuring the actual impact of control measures and strategies on concentrations and/or deposition of pollutants;

- Identification of risk areas for potential violations to emission limits.

**Scope:** There is a pressing need to measure accurately the different types of emissions in coastal and port environments located near to cities, because of their negative impact on the environment and human health. Ports, as intricate environments showcasing a variety of vessels including novel designs, pose a challenge to the development of standardised technologies capable of collecting and assessing real-time pollutant emissions data from these ships docking at ports. This is vital for enforcing emissions limits and validating the data for enforcement purposes.

Moreover, emissions in ports stem from other sources, such as port operations (e.g., cargo handling, towing, fuel storage, and bunkering) or even other industrial activities (directly or indirectly linked to transport, e.g., fisheries) taking place within the port area. Additionally, ports are frequently situated near industrial zones, making it crucial to possess an accurate and, where possible, real-time understanding of the types, origins, and intensity of pollutant and noise emissions generated in and around a port area.

The shift from heavy fuel oils to alternative fuels in the context of the regulatory framework<sup>191</sup> set to achieve the objectives of the Green Deal requires further research actions; recent evidence from research and monitoring projects has shown that new fuels being considered and GHG emission-control technologies used on-board vessels may result in emissions of other harmful pollutants that are not sufficiently controlled. In some cases, unexpected side effects of emission abatement may arise which might require regulatory action<sup>192</sup>.

Further to such undesired releases, it is crucial to ensure that vessels comply with regulations in force, in coastal areas, at open sea and in inland waterways. Projects under call LC-MG-1-1-2018 of Horizon 2020 showed that remote measurement of SO<sub>x</sub> emissions using stationary or mobile techniques can significantly increase the cost-effectiveness of compliance monitoring. It is important to explore whether remote or on-board techniques can be extended to the monitoring of additional pollutants such as CH<sub>4</sub>, NO<sub>x</sub>, N<sub>2</sub>O, NH<sub>3</sub>, UFP, BC,

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<sup>191</sup> The IMO's 2023 GHG Strategy targets net-zero greenhouse gas emissions from international shipping by 2050, with interim goals for 2030 and 2040. Measures include the adoption of lower-carbon fuels such as methanol and ammonia. In the EU, initiatives like FuelEU Maritime and ETS inclusion will drive this transition while regulations address harmful emissions like sulphur and nitrogen oxides, with Tier III NO<sub>x</sub> limits enforced. Discussions also focus on Black Carbon emissions in the Arctic and health impacts of ultrafine particles.

<sup>192</sup> For example, evidence shows that the introduced Tiers may not be effective in controlling NO<sub>x</sub> emissions in real vessel operation, scrubbers may result in the formation of new ultra-fine particles, ammonia combustion potentially leads to the formation of nitrous oxide and ammonia slip, methanol combustion may lead to the production of formaldehyde, LNG may result in the slip of methane, etc. Obviously, any strategy targeting the control of GHG or air pollutants should not result in negative side-effects such as the release of harmful pollutants which are today not covered by regulations.

formaldehyde, PM<sup>193</sup>, as well as the Particle Number (PN), NPAHs and to provide internationally harmonised methods and reporting procedures where such measurements can be used within an enhanced compliance monitoring framework in the future. These methods should also have the potential to be used as evidence for law enforcement to enable independent prosecution of violations. Furthermore, there is a need to develop engine testing procedures that better represent operational patterns in order for the emission values from test cycles to accurately represent real emissions.

Limited surveillance measurements at open seas show a different compliance (lower compliance) behaviour for sulphur emissions compared to measurements in coastal regions. Therefore, it is important to identify risk areas for violations and to establish techniques for monitoring in these areas as well. It is of equally great importance to develop harmonised/standardised monitoring methods that could be used as evidence for sanctions in the future.

Assessment of the real-world performance of emission control, in particular for Tier III vessels, is therefore required to make sure that current NOx regulations achieve and sustain the emission reductions that these regulations are designed for. Further, certification testing should be modified to better address real world conditions. Moreover, potential ammonia slip from urea consumption needs to be identified, and N<sub>2</sub>O emission levels need to be determined to ensure that GHG reduction efforts are not thwarted.

In addition, no established method for identifying NOx emissions that exceed existing standards under real sailing operation is currently in place. Based on different remote or on-board measurement techniques, harmonised methods, and reporting procedures to identify exceedances of expected emission levels needs to be designed and put in action, at least for informative reasons – as no enforcement of low NOx under real operation is currently in place.

With CH<sub>4</sub> being a potent GHG, any uncontrolled releases from LNG powered vessels significantly compromise any lower carbon benefits of the LNG as a fuel. Moreover, although boil-off gas (BOG) should be reliquefied or used on-board, records of BOG release to the atmosphere have been reported. The extent of any remaining current problem needs to be identified and measurements on methane slip from actual vessels need to identify the extent of emissions, considering potential needs for methane emission limits (for the engines as well as for the fuel storage onboard and the bunkering process). The problem with methane slip will also remain with the use of bio-methane as fuel.

New fuels are considered in the effort to decarbonise shipping, with the most prominent being ammonia (NH<sub>3</sub>), methanol (MeOH) and hydrogen. There is currently limited evidence on new pollution dimensions induced by such fuels, including ultrafine particles of non-carbonaceous origin, N<sub>2</sub>O and NH<sub>3</sub> emissions, NPAH, Formaldehyde PM, NOx, etc. Measurements on actual marine engines and vessels using such fuels need to provide new evidence in the pool

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<sup>193</sup> CH4 – methane; NOx - nitrogen oxides; N2O – nitrous oxide; UFP – ultra-fine particles; BC – black carbon; PM – particulate matter.

of data forming so that early measures are taken before such new fuels become widespread in actual use, in case such new emissions prove to be at a level that constitute health hazards or environmental risks. Zero carbon fuels like NH<sub>3</sub> and H<sub>2</sub>, as well as dual-fuel engines and CO<sub>2</sub> capture onboard require different remote measurement methods, since CO<sub>2</sub> is no longer a stable and dominant reference gas in the exhaust plume. Alternative options in sensing and calculation method need to be introduced.

Demonstration must be undertaken within a real operational environment. In the collection and analysis of remote as well as static sensing data for the monitoring of emissions and air pollutants, the accuracy of the sensors and the quality and verifiability of the data obtained are of particular importance. Potential risks and problems in data collection and sensor technology, in particular as regards the identification of the source of the pollution, should be analysed in detail. A verifiable methodology is also required for processing and interpreting the data in the next step. Issues such as access to data, data storage and associated security aspects (including the assessment of cyber security of interoperable systems) should be fully considered. Particular efforts should be made to ensure that the data produced in the context of this topic is FAIR<sup>194</sup>.

To address all these highlighted issues, proposals are required to undertake all the following R&I activities:

- Map high emission activities and demonstrate port, coastal, inland and open sea monitoring techniques for at least NO<sub>x</sub>, BC, N<sub>2</sub>O, UFP, NH<sub>3</sub>, CH<sub>4</sub>, PM as well as PN and NMVOC (or any other related pollutants), during normal operation of ships which includes dynamic engine loads of all ship types (including port service vessels) and suitable for zero carbon fuels, dual-fuel engines and carbon capture. All the emission measurements have to be integrated through static and remote sensing in order to share data;
- Demonstration of the developed measuring technologies in 6 different TEN-T ports, (of which 3 Core and 3 Comprehensive ports, covering at least three sea basins of the Black, Mediterranean, North Sea, N. Atlantic and Baltic Seas). Out of these 6 ports at least one should be classified as a TEN-T inland-waterway only port according to Annex II of the TEN-T Regulation. At least one of the ports should be situated in a city participating in the Cities Mission and activities should feed into the implementation of the Climate City Contract (CCC), with abatement measures and port-city collaborative governance approaches to match or enhance CCC commitments. The selection of ports should be such as to cover a wide range of emission profiles and take into consideration the complexity of emission sources in order to ensure that the outcome is representative and can be replicated to other ports;
- Identify, differentiate and measure in real time at or near possible sources of emissions (e.g., individual vessel, specific port operations, industrial installations within and very close to the port area) under complex (geographical, layout, mixed space uses and other)

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<sup>194</sup> Findable, Accessible, Interoperable and Reusable

conditions and variable weather conditions. The calibration of the measurement systems and the reproducibility of the results should be demonstrated;

- Development of a methodology for assessing pollution within the port area including emissions from all transport modes, port operations and industries located in the port area;
- Identify the impact of emissions in ports and nearby cities and propose mitigating measures and plans for municipalities and port authorities, including ports in which municipalities are not directly involved in the management of port authorities and terminals;
- Development of Real-Time Decision Support Systems (RT DSS) for ships, onboard ship operations, ship operators to look into data collected to enable port and maritime authorities to make decisions about rebates;
- Development of harmonised monitoring techniques and an automatic reporting and verification system solution helping shipowners to comply with current and future EU and international regulation as well as public authorities to monitor and control emissions from the data exchanged;
- Harmonise/standardise monitoring techniques and reporting with the potential to be used for legal prosecution; develop recommendations for improved certification and testing for real world situations;
- Increase evidence to feed pool of data for regulated and non-regulated pollutants from vessels;
- Identify pollutants from new fuels used for shipping decarbonisation;
- Develop protocol(s) for the measurement of BC, UFP, and PN from vessels;
- Develop engine testing methods to better mimic real-world emissions and propose a vessel grading system methodology with respect to its emissions comparable to EURO classification of road vehicles.

Proposals should demonstrate how they will engage with authorities and local communities in disseminating results in proportion to their expected impacts. Relevant authorities include the European Commission, the Bonn Agreement, Helcom, the IMO, and national, regional, and local competent authorities etc. while local communities are primarily, but not limited to, major port cities and coastal areas in the EU.

Proposals are encouraged to explore and use the results from previous EU-funded projects such as SCIPPER (Horizon 2020), EMERGE (Horizon 2020) and Green C Ports (CEF), Interreg Clean North Sea Shipping and LIFE CLINSH (CLEan Inland SHipping) as well as develop complementarities with relevant activities funded under the Horizon Europe call on “Advanced transport emissions monitoring networks” (HORIZON-CL5-2023-D5-01-18) and

activities developing satellite-based measurements (Cluster 4 Destination 5 (Space) and EUSPA), focusing on remaining gaps not covered by these projects. Duplication of activities should be avoided.

Proposals are encouraged to include and consider the fisheries sectors and fishing vessels, considering their potential intersections with the use of alternative fuels in ports when relevant. Consideration of projects such as HORIZON-MISS-2023-OCEAN-01-05 and PPPA-2024-FISHVESSELDEMO may prove beneficial.

The funded projects will share their experience and good practices with the projects selected under the topic of the EU Ocean & Waters Mission on “Restoring waterfront cities and their ports /maritime infrastructures (HORIZON-MISS-2025-03-OCEAN-05) and links should also be established with the projects funded under topic HORIZON-CL4-SPACE-2025-01-46: Innovative Earth observation services in support of maritime litter detection and ship source pollution policies.

This topic has been programmed, and is contributing to the implementation of, the Zero-Emission Waterborne Transport (ZEWT) partnership and the Climate Neutral and Smart Cities Mission.

### **Cross-cutting**

Proposals are invited against the following topic(s):

### **HORIZON-CL5-2025-01-D5-18: Support to the organisation and dissemination of the Transport Research Arena (TRA) conference**

<b>Call: Cluster 5 Call 01-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 1.60 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 1.60 million.
<i>Type of Action</i>	Coordination and Support Actions
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy</p>

	Community (2021-2025). <sup>195</sup>
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**Expected Outcome:** Project's results are expected to contribute to all of the following expected outcomes:

- Successful organisation of the Transport Research Arena conference (TRA) in 2028;
- Successful organisation of two competitions for transport research and innovation awards covering all transport modes and cross-cutting issues;
- Conference proceedings published in recognised scientific journals;
- Higher visibility, political and strategic relevance of the transport sector and of the EU policy in the field;
- Enhanced dissemination, communication and valorisation of transport R&I objectives, perspectives, strategies and results;
- More effective links and exchanges between research and innovation stakeholders, industry and policy makers, to support the development and deployment of innovative solutions in Europe;
- Increased attractiveness of transport related studies and reinforce the pursuit of excellence in European transport research and innovation, by giving recognition and visibility to the best achievements;
- Increased visibility, interest and number of applications for the two competitions for transport research and innovation awards.

**Scope:** The action will prepare and provide support to the Transport Research Arena (TRA) conference to be organised in 2028 gathering transport stakeholders for discussing political, industrial and research issues on a European and global level.

Proposals are expected to demonstrate the financial and organisational support of the national authorities interested to host the event and an economic plan covering the additional funding needs. A professional conference organiser should be included in the consortium. To ensure high political and strategic relevance, the proposals should involve Member States holding the Presidency of the European Union in year 2028.

In line with previous TRA biannual conferences, the event should address the technological and industrial developments of the transport sector (i.e., road, rail, waterborne, aviation sectors and cross-modal aspects) providing a high level, future-oriented perspective coming from politics, the industry and the research community, in response to Europe's social needs

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<sup>195</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

and expectations. Specific attention should be put on a broad and balanced participation in the conference i.e., students, young researchers, women, a large number of country representatives, etc.

The action will be implemented in close collaboration with the Management and Programme Committees of the TRA, which includes the TRA 2028 conference organiser, the European Commission services, the different European Technology Platforms (ERTRAC for road, ERRAC for rail, WATERBORNE TP for waterborne, ALICE for logistics and ACARE for aeronautics and ECTP for construction), the Conference of European Directors of Roads (CEDR), the European Transport Research Alliance (ETRA) and the previous TRA conference organiser (TRA 2026) in order to maintain continuity of the event.

Proposals should address all the following aspects:

- Support the definition of the overall planning of the conference, including the main thematic pillars of the event as well as the structuring of the technical and political sessions;
- Contribute to the identification and selection of an appropriate conference venue and support the organisation of the conference's logistics;
- Provide operational support to the TRA conference organisers, such as in relation to the website and conference management IT tools (e.g., for the registration of participants, handling of speakers' contributions, submission and selection of scientific papers, conference application);
- Support the organisation of the demonstration activities and technical visits;
- Assess and monitor the environmental impact of the event and propose appropriate measures to reduce and mitigate this impact;
- Organise of two high-quality competitions for transport research and innovation awards (TRA VISION) covering all transport modes and cross-cutting issues (technological, socio-economic, and behavioural aspects) in line with the EU policy objectives for climate-neutral and environmentally friendly mobility:
  - A competition for students and young researchers with the goal of stimulating the interest among young researchers/students to develop innovative solutions in the field of transport;
  - A competition for senior researchers in the field of innovative transport concepts based on results from EU-funded projects only.
- Proposals should plan for involving the awarded researchers in the conference programme and for promoting links between the researchers and possible career development opportunities in the field (e.g., traineeships, jobs, courses, training);

- o A very good media coverage before, during and after the event should be foreseen for both the TRA conference and for the TRA VISIONS.

**HORIZON-CL5-2025-01-D5-19: Increased participation, knowledge sharing, dissemination and implementation support to strengthen the European road transport R&I landscape in Europe and around the World, increasing its global competitiveness**

<b>Call: Cluster 5 Call 01-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 2.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 2.00 million.
<i>Type of Action</i>	Coordination and Support Actions
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>196</sup></p>

**Expected Outcome:** Project's results are expected to contribute to all of the following expected outcomes:

- Increased participation of actors and stakeholders to EU activities in the area of road transport, also supporting a more coherent and inclusive European alignment in specific identified areas;
- Identified state of the art, requirements and developments, future needs and barriers to foster the deployment of EU R&I results and proposals for action to support the future of the European road transport area R&I, also including skills and standards;
- Identified possible renewed strategy for research infrastructure ecosystems in the Road Transport sector;

<sup>196</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

- Increased international cooperation on road transport with related national and international organizations and support of international EU activities in line with the UN Sustainable Development Goals and supporting the competitiveness of the EU industry, in particular the US and the Global South;
- Widespread dissemination of contribution from road transport research, in particular from EU funded projects, focused on the realization of the European Green Deal, the new European industrial policy, the European Union digital strategy as well as Vision Zero for road safety;
- Knowledge sharing and widely promoted R&I activities, in particular via road transport events to support identification of future requirements, potential developments, white spots and precompetitive activities.

**Scope:** The objective of this topic is to further promote Research and Innovation (R&I) leading to sustainable road transport in Europe and at an international level. The action is expected to help identify future R&I needs, gather an increased number of innovative actors and stakeholders, stimulate a wider participation to EU activities and support European plus Worldwide dissemination of results and support the identification of possible future actions in view of a renewed European competitiveness. This action shall provide a positive contribution to the European Research Area, as well as to the European strategies for future transport systems and the EU's collaboration in R&I with international partners. In addition, this initiative will support climate action and air quality improvement in line with the Green Deals targets and objectives, Vision Zero for road safety, contribute to the United Nations (UN) Sustainable Development Goals as well as the EU's digital strategy.

In line with these objectives, all the following aspects will need to be addressed:

- Widen and increase the European future road transport R&I environment by providing an enlarged, more innovative and more representative number of interested stakeholders that could currently be less represented in existing European platforms, networks and associations (both geographically and thematically);
- Identification of actions to support the road transport R&I area, e.g. identify state of the art, future and innovative requirements, potential technical developments and white spots, and potential precompetitive activities;
- Identification of in-depth state of the art and barriers for the deployment of EU research results at European and international level, co-development of options to overcome them, including development of innovation plans and analysis of competitiveness issues to support the alignment of European stakeholders in the following specific areas: “Urban zero-emission mobility”, “Improved air quality”, “Future road safety”, “Zero-emission long-haul logistics” and “Digitalisation of road transport” (including all relevant aspects related to Artificial Intelligence, big data and Software Defined Vehicles);

- Assess the current road transport related research infrastructures (RI) in Europe and, based on this, analyse and identify needs towards a strategy for the establishment of a research infrastructure (RI) ecosystems in the Road Transport sector that addresses EU priorities and strategic autonomy together with the EU's capacity for excellent research;
- To foster innovation aspects of road transport R&I, at least 4 specific events or workshops will be organised to present, discuss and disseminate the analysed technology needs, trends and results of the above points. In addition, direct support (such as financial, organisational, communication and dissemination) is expected to the annual Road Transport Research Conferences co-organised by the European Commission, ERTRAC, and the 2Zero, CCAM and BATT4EU Partnerships;
- Support the identification and scaling up of activities at an EU level in the fields of education, training and skilling/reskilling and standardisation;
- In the field of international cooperation in line with the UN SDGs and to support the European industrial competitiveness for the future road transport sector:
  - Following-up the previous EU-US transport research symposia (co-organised by the European Commission) in the specific sectors of “Decarbonisation” and “Digitalisation”, provide a deep analysis of the implementation and evaluation of EU research funded projects and activities to support the alignment with the US (mainly under the DoE and DoT programmes) on technological, societal, systemic and spatial dimensions of R&I in road transport.
  - Analyse EU research funded projects and activities related to electromobility in urban areas in emerging economies (specifically in Africa, Asia and Latin America) and support further dissemination and replication of implemented solutions in other regions via specific workshops and events, mainly online. This shall also facilitate the exchange of information of EU actors and projects with key international cooperation programmes such as the Global Gateway and the UN Global Environment Facility (GEF).

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

This Destination includes activities addressing safe and smart mobility services for passengers and goods.

This Destination contributes directly to the Strategic Plan's **Key Strategic Orientations** '*Green transition*', '*Digital transition*' and '*A more resilient, competitive, inclusive and democratic Europe*'.

In line with the Strategic Plan, the overall **expected impact** of this Destination is to contribute to the '*Multimodal systems and services for climate-neutral, smart and safe mobility*'.

**The main impacts to be generated by topics under this Destination are:**

### *Connected, Cooperative and Automated Mobility (CCAM)*

1. Safe, inclusive, affordable, attractive and accessible door-to-door (incl. shared) mobility for people and goods, including freight services and last-mile deliveries, in all weather conditions, seamlessly integrated with various transportation modes to ensure interoperability and full integration of CCAM solutions into the existing transport ecosystem;
2. Resilient, climate neutral, and sustainable mobility solutions with a reduced carbon footprint leading to greener, less congested, cost-effective and more demand-responsive transport everywhere;
3. Smart mobility services based on user-centric and explainable technologies and services, including digital technologies, advanced satellite navigation services, and smart traffic management (AI enabled when appropriate), considering the diverse needs and behaviours of categories of end-users;
4. Improvement of road safety thanks to the progressive transition of road traffic towards automation and Advanced Driver Assistance Systems (ADAS).

### *Multimodal and sustainable transport systems for passengers and goods*

1. Advanced knowledge base and solutions for climate neutral and resilient infrastructure;
2. More efficient, sustainable, safe and competitive infrastructure construction, maintenance, inspection and monitoring in a "whole life cycle" approach;
3. Existing and new transport infrastructure is designed/adapted to support deployment of new technologies and fuels in view of improving its performance, user experience and safety, support seamless and efficient multimodality and limit transport related emissions;
4. Reduced emissions and increased efficiency and competitiveness of long-haul and regional freight transport and logistics, including the supply chain optimisation.

***Safety and resilience***

1. Drastic reduction in serious injuries and fatalities in road crashes involving cyclists, pedestrians and users of micro-mobility devices;
2. Predictive framework is established using AI and big data for transport safety;
3. Optimised Human-technology interaction that minimises confusion, distraction and thus collision risks;
4. Enhanced aviation safety under adverse weather conditions.

**Connected, Cooperative and Automated Mobility (CCAM)**

Proposals are invited against the following topic(s):

**HORIZON-CL5-2025-01-D6-01: Advancing remote operations to enable the sustainable and smart mobility of people and goods based on operational and societal needs (CCAM Partnership) – Societal Readiness Pilot**

<b>Call: Cluster 5 Call 01-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 6.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 12.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Admissibility conditions</i>	The conditions are described in General Annex A. The following exceptions apply: The page limit is extended by two pages to 47.
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 5 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G. The following exceptions apply: Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the

	Research and Training Programme of the European Atomic Energy Community (2021-2025). <sup>197</sup>
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Expected Outcome: Project results are expected to contribute to all of the following outcomes:

- Comprehensive set of principles, guidelines and requirements for remote operations that clarify operational complexities (e.g., safety, (cyber-)security, liability, privacy, certification and operator training, interoperability, cross-border operations) is defined, and a standardised approach to extend the Operational Design Domain (ODD) of CCAM solutions is established;
- Infrastructure prerequisites, particularly in technology and communications (safe and reliable communication, especially considering SNS components for the automotive sector<sup>198</sup>) are defined, which are critical for the successful implementation of remote operation capabilities, outlining the technical standards and investments necessary for seamless integration with current transport systems, while appreciating the potential environmental impact;
- Safety validation methodologies extended to remote operations favouring acceptance and trust of road users in such CCAM systems;
- Identification and description of at least two economically viable business cases for remote operations complementing the ODD of CCAM solutions, analysing the economic costs and benefits, market potential, and scalability factors, and providing a clear value proposition for public or private stakeholders for each use case;
- Understanding human factors, legal requirements and working conditions for remote operators, addressing cognitive load, fatigue and stress, ergonomic considerations, and the identification of essential skills. Establishment of key conditions for job quality, safety, up-to-date competences and acceptance of working conditions in diverse cultural contexts;
- Responsiveness to a deeper understanding of the needs and concerns of diverse social groups involved in or potentially affected by the R&I development, considering gender and other social categories, and thereby increasing the potential for beneficial societal uptake, and building trust in results and outcomes;
- Policy and governance recommendations in view of establishing new or updating existing legislation to cover remote operations, e.g., through clear descriptions of stakeholder roles and responsibilities that may vary for different types of remote operations.

<sup>197</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

<sup>198</sup> See SNS calls for further linkage.

**Scope:** This topic aims at exploring the operational and societal conditions and prerequisites for complementing the ODD of CCAM solutions through remote operations, as defined by the United Nations Economic Commission for Europe (UNECE)<sup>199</sup>. Here “remote operations” is to be understood as the remote monitoring, assisting, and operating the Automated Driving System (ADS) by a person located externally. The vehicle operates with a high degree of automation (SAE Level 4), but a human operator can monitor its actions and surroundings remotely and intervene, if needed. Intervention ranges from providing strategic guidance and tactical commands to determining vehicle manoeuvres and taking over control in scenarios that include, but are not limited to, emergency responses, system malfunctions, ADS system limits, or complex navigational challenges unforeseen by the CCAM system.

The topic invites proposals to explore two use cases that should focus on remote operations on urban and rural public roads and/ or confined areas, dealing with at least two of the following areas:

- Transport of people: use cases that enhance public transport services (i.e., by fleets of remotely operated shared vehicles, including, if relevant, on-demand responsive transport) improving accessibility and mobility for users in all their diversity in terms of all characteristics (e.g., age, gender, disability, etc);
- Transport of goods: use cases that optimise logistics (e.g., remotely operated delivery vehicles in urban environment), improving efficiency and sustainability;
- Combination of people and goods transport: use cases of integrated solutions (e.g., remotely operated vehicles that transport goods during off-peak hours and convert into passenger transport services during peak times), improving vehicle utilisation, while addressing congestion and reducing environmental impact.

For each of these use-cases, operational and societal aspects that would enable remote operations of multiple ADSs must be evaluated in terms of business models, infrastructure needs, safety assurance, legislation, as well as organisational aspects that may include cultural elements. Additionally, operator’s skills, performance and situational awareness of the remote operator must be addressed. The analysis of potential rebound effects and questions related to energy sufficiency and sustainability should not be neglected. Where applicable, the use of generative AI should be considered.

This topic aims to understand all the different components of the complex ‘system-of-systems’, combining technological advancements with a focus on human-centred design and societal needs, as well as its implications from the start. This will enable to lay the foundation for the development of advanced demonstrator use cases, integrating the various components in next phases, although technological adaptations of existing approaches to reach an integrated system-of-systems should already be validated in the relevant environment here.

Technological components of the system-of-system are foreseen to include e.g. infrastructure support, communications, cyber-security, key enabling technologies (possibly including

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[https://unece.org/sites/default/files/2023-03/Informal%20document%20No16e\\_0.pdf](https://unece.org/sites/default/files/2023-03/Informal%20document%20No16e_0.pdf)

generative AI, etc.). Proper selection of existing technology enablers and related SW developments to implement the remote operation functions are required. Societal aspects are identified (e.g., user-centric design, working conditions), through the inclusive engagement of stakeholders for problem formulation and concepts development, co-creation and co-assessment of deployment and operations.

Stakeholders could include user groups and public advocacy organisations, mobility companies, technology providers, public agencies, planners, community groups, industry associations, first responders, social partners<sup>200</sup> and workforce representatives. These should be involved in building awareness, trust, and support for remote operations, identifying skill gaps and skill transferability of operators as well as training needs. Additionally, various stakeholders should be engaged to examine unanticipated implications (e.g., environmental, social equity etc.) and to co-develop solutions, as well as other pre-conditions making remote operations feasible (e.g., policy, governance, territorial planning, infrastructural readiness, integration into Traffic Management Systems (TMS), organisational and legislative requirements etc.).

The dimensions of Responsible Research and Innovation (RRI) – reflection, inclusion, anticipation, and responsiveness – should guide the exploration of these components to achieve societal readiness, involving relevant Social Sciences and Humanities (SSH) disciplines (e.g., psychology, geography, science and technology studies, sociology, ethics).

The safety assurance of remote operations will require the development of a corresponding validation methodology, as the remote operator with the wireless communication system and the related interfaces becomes part of the system to be validated. Proposed actions shall develop the basic principles of such a methodology considering the framework provided by EU 2022/1426, building upon, to the extent possible, the results of the SUNRISE<sup>201</sup> project and seeking close coordination with actions under HORIZON-CL5-2023-D6-01-02<sup>202</sup>, HORIZON-CL5-2024-D6-01-02<sup>203</sup> as well as HORIZON-CL5-2024-D6-01-03<sup>204</sup>.

**This topic is a Societal-Readiness pilot:**

- Proposals must follow the specific requirements applying to the Societal readiness pilot, as described in the introduction of the Horizon Europe Main Work Programme 2025 for Climate, Energy and Mobility. They entail the use of an interdisciplinary approach to deepening consideration and responsiveness of research and innovation activities to societal needs and concerns.
- This topic requires effective contribution of the relevant SSH expertise, including the involvement of SSH experts in the consortium, to meaningfully support Societal

<sup>200</sup> As per the legal basis of Art. 154 of the TFEU.

<sup>201</sup> [Safety assurance framework for connected and automated mobility system](#), grant agreement ID: [101069573](#).

<sup>202</sup> Generation of scenarios for development, training, virtual testing, and validation of CCAM systems.

<sup>203</sup> Scenario-based safety assurance of CCAM and related HMI in a dynamically evolving transport system.

<sup>204</sup> Orchestration of heterogeneous actors in mixed traffic within the CCAM ecosystem.

Readiness. Specifically, SSH expertise is expected to facilitate the socio-technological interface and enable the design of project objectives with Societal Readiness related activities.

This topic implements the co-programmed European Partnership on ‘Connected, Cooperative and Automated Mobility’ (CCAM). As such, projects resulting from this topic will be expected to report on results to the European Partnership ‘Connected, Cooperative and Automated Mobility’ (CCAM) in support of the monitoring of its KPIs.

Projects resulting from this topic are expected to apply the European Common Evaluation Methodology (EU-CEM) for CCAM<sup>205</sup>.

**HORIZON-CL5-2025-01-D6-02: Preparing for large-scale CCAM demonstrations (CCAM Partnership) – Societal Readiness Pilot**

<b>Call: Cluster 5 Call 01-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 4.00 million.
<i>Type of Action</i>	Coordination and Support Actions
<i>Admissibility conditions</i>	<p>The conditions are described in General Annex A. The following exceptions apply:</p> <p>The page limit is extended by two pages to 32.</p>
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>206</sup></p>

Expected Outcome: Project results are expected to contribute to all of the following outcomes:

<sup>205</sup> See the evaluation methodology [here](#).

<sup>206</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/lst-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/lst-decision_he_en.pdf)

- Pave the road for forthcoming CCAM deployment and deliver a comprehensive large-scale demonstration plan for CCAM vehicles across Europe;
- Ensure the engagement of key stakeholders across the value chain in transport and mobility, including required industrial partners (such as OEMs and suppliers) and a range of end users and service providers;
- Establish the foundation for future use case specific projects in different domains, such as public and private road transport and logistics, alongside the large-scale demonstrations;
- Outline a CCAM promotion strategy, supporting elevated public engagement and awareness;
- Responsiveness to a deeper understanding of the needs and concerns of diverse social groups involved in or potentially affected by the R&I development, thereby increasing the potential for beneficial societal uptake, and building trust in results and outcomes.

**Scope:** In recent years, the work in vehicle automation has concentrated on technological advancements, human factors, extensive testing, and demonstrations to raise public awareness and facilitate market readiness. Even with the progress achieved, the challenges related to technical functionality as well as use, demand and affordability remain considerable.

To tackle these challenges, a sensible approach is needed to implement vehicle automation developments in real-life applications via large-scale demonstrations such as Field Operational Tests (FOTs) within Living Labs. Additionally, particular use cases for public road transport and logistics should be targeted. The validation of technical enablers (also considering technological readiness), understanding user behaviour, promoting acceptance and advancing societal readiness for both mobility of people and transport of goods remains a major focus. The tests and large-scale demonstrations must be conducted in both mixed traffic conditions and confined areas, where applicable. Ensuring interoperability of connected automated systems across various vehicle brands, regions, and Member States is essential.

Since successful large-scale demonstration activities require strong and early engagement from key stakeholders, comprehensive planning and preparatory actions, leveraging previous and ongoing efforts, are needed to ensure European competitiveness and leadership.

The action shall leverage previous and ongoing projects at European and national levels on demonstration activities. It should consider the outcomes of the European software-defined vehicle of the future initiative. The frameworks and guidelines formulated by the CCAM Partnership shall be duly reflected<sup>207</sup>. This is to optimise the return on investments and create a strong basis for future large-scale demonstration projects to boost an industry-wide European deployment strategy for CCAM.

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<sup>207</sup> <https://www.ccam.eu/>  
<https://www.connectedautomateddriving.eu/>

Proposed actions for this topic are expected to address all of the following aspects:

- Define the prerequisites for performing large-scale demonstration projects, considering vehicle technology maturity and other technical enablers, physical and digital infrastructures, as well as approval frameworks for public road testing;
- Prepare and refine methodologies, test procedures and tools for the execution of field tests and efficient data management;
- Identify test and demonstration sites across Europe for CCAM functions, considering the extension of Operational Design Domains (ODDs), using vehicular communication technologies (V2X) that enables Traffic Management Systems (TMS) for improved traffic flow and operational efficiency;
- Initiate a cross-sector stakeholder forum for the definition of use case relevant projects in different domains and their implementation.

The proposed action shall foster the collaboration between public and private stakeholders to achieve common objectives and assess societal impacts. Engagement of key stakeholders, such as mobility and transport users, European industrial players such as OEMs and suppliers, public transport, shared mobility and logistics operators, infrastructure providers, traffic managers, public authorities, and research institutions must be ensured.

This topic is a Societal-Readiness pilot:

- Proposals must follow the specific requirements applying to the Societal readiness pilot, as described in the introduction of the Horizon Europe Main Work Programme 2025 for Climate, Energy and Mobility. They entail the use of an interdisciplinary approach to deepening consideration and responsiveness of research and innovation activities to societal needs and concerns.
- This topic requires effective contribution of the relevant SSH expertise, including the involvement of SSH experts in the consortium, to meaningfully support Societal Readiness. Specifically, SSH expertise is expected to facilitate the socio-technological interface and enable the design of project objectives with Societal Readiness related activities.

This topic implements the co-programmed European Partnership on ‘Connected, Cooperative and Automated Mobility’ (CCAM). As such, projects resulting from this topic will be expected to report on results to the European Partnership ‘Connected, Cooperative and Automated Mobility’ (CCAM) in support of the monitoring of its KPIs.

The project should build upon the results of the FAME<sup>208</sup> project and on the actions under HORIZON-CL5-2024-D6-01-05<sup>209</sup> to ensure complementarity between activities.

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Framework for coordination of Automated Mobility in Europe, grant agreement ID: [101069898](#).

Projects resulting from this topic are expected to apply the European Common Evaluation Methodology (EU-CEM) for CCAM<sup>210</sup>.

**HORIZON-CL5-2026-01-D6-03: Next-generation environment perception for real world CCAM operations: Error-free and secure technologies to improve energy-efficiency, cost-effectiveness, and circularity (CCAM Partnership)**

<b>Call: Cluster 5 Call 01-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 8.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 5 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). <sup>211</sup>.</p>

Expected Outcome: Project results are expected to contribute to all of the following outcomes:

- Availability of validated prototypes of next-generation vehicle and infrastructure-based environment perception technologies for robust, reliable and trustworthy CCAM operations to anticipate and avoid foreseeable risks and unexpected safety-critical situations in complex real-world conditions (e.g., at pedestrian crossings, in construction sites, during interactions with emergency vehicles, etc.);

<sup>209</sup> Robust Knowledge and Know-How transfer for Key – Deployment Pathways and implementation of the EU-CEM.

<sup>210</sup> See the evaluation methodology [here](#).

<sup>211</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/l-single-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/l-single-decision_he_en.pdf)

- Understanding the degree (and limits) to which automated CCAM perception systems can anticipate, process, and respond to on-site ‘early-warnings’ (e.g., street design, sounds, smells and other signals from the environment, intentions of pedestrians, cyclists, and other active mobility users, etc.);
- Improvement of the energy-efficiency of the sense-think-act systems of CCAM considering the vehicle, the infrastructure, the cloud at-the-edge, while at the same time increasing the performance to guarantee security and error-free reliability; these developments will contribute to the reduction of the potential climate and environmental footprints of CCAM systems;
- Standardisation and adoption of modular, reusable, and upgradable software and hardware platforms, investigating scalable deployment concepts that lead to cost reduction and improved affordability while adopting a circular, eco-design approach (including efficient materials use, reduced waste, and the repair and reuse of components where feasible).

**Scope:** The initial deployment of Level 4 automated vehicle services in urban and other complex settings has encountered significant challenges in environmental perception and decision-making, leading to occasional remote assistance calls, blockages and accidents that have impacted public trust. At the same time, the increasing computing power demand implies a limited usage of energy and resources to meet sustainability requirements. Thus, emerging large-scale demonstrations of automated vehicles must be accompanied by objective-oriented research aimed at addressing these challenges directly while targeting improvements in performance, accuracy, reliability, and cyber-security by focusing on:

- Advancements in all steps of the sense-control-act process for both vehicle- and infrastructure-based smart sensor systems and networks, controllers, and actuators to ensure safety and trustworthiness of CCAM;
- Utilisation of digital enabling technologies including, for example: AI at-the-edge, machine learning, data spaces with reference scenarios and suitable software architectures<sup>212</sup>;
- Adoption of modular, reusable, and open software platforms supporting the environment perception for CCAM while ensuring transparency of operation, verification, and safety assessment to build trust, with respect to authorities, decision makers and the public via direct performance explainability;
- Energy efficiency, circularity, and eco-design of the environment perception systems by decreasing potential energy and resource consumption in both production and operation as well as facilitating reusability, reparability and upgradability while further enhancing the performance;

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<sup>212</sup> In line with the European Artificial Intelligence strategy and requirements for trustworthy, explainable, and safe AI.

- Reduction of potential costs of environment perception systems through scalability, modularity and standardisation, making technologies financially viable for widespread implementation;
- Support remote assistance as a stepping-stone towards higher levels of autonomy and vehicle automation in wider Operational Design Domains (ODD).

Solutions are expected to integrate electronic hardware architectures and software stacks in a co-design approach. Hence, it is strongly encouraged that solutions use, as far as possible, building blocks and tools from projects of the Software-Defined Vehicle of the Future (SDVoF) initiative under the Chips Joint Undertaking, e.g., on the hardware abstraction layer and SDV middleware and API framework. Results from projects funded under HORIZON-CL5-2024-D6-01-04<sup>213</sup> and complementarities with projects funded under Horizon Europe Cluster 4 “Digital Industry and Space” should also be considered, where appropriate.

As the activities should demonstrate feasibility and their full potential for real-world applications, proposals should foresee exchanges with other relevant EU or national projects for e.g., coordinated validation, transport systems integration and large-scale piloting. Collaboration should also be sought with projects funded under HORIZON-CL5-2024-D6-01-01<sup>214</sup> and other directly relevant call topics.

In view of the relevance of environment perception and decision-making of automated vehicles for the responsiveness of the innovation to diverse societal interests and concerns, accessibility, inclusiveness as well as regulation, proposals should consider societal, ethical, socio-economical and/ or legal aspects as far as feasible in the requirements of the technical solutions to be developed. This could involve the engagement of institutional users as well as citizen-science approaches, e.g., in collaboration with projects CulturalRoad<sup>215</sup> and Diversify – CCAM<sup>216</sup>.

To achieve the expected outcomes, international cooperation is highly relevant, considering the lessons learned (for example, from robo-taxi trials in the US and China). Activities should foster links between the European ecosystem and relevant stakeholders around the world, in particular with Japan and the United States but also with other relevant strategic partners in third countries, while taking into account the legal, cultural, historical, and social aspects in Europe as well as other specificities of the European road network and cities (including: traffic rules, user behaviour, diverse user groups considering gender, age, disability, socio-economic status, etc., streets morphology, and the structure and condition of roads in rural areas).

This topic implements the co-programmed European Partnership on ‘Connected, Cooperative and Automated Mobility’ (CCAM). As such, projects resulting from this topic will be

<sup>213</sup> AI for advanced and collective perception and decision making for CCAM applications

<sup>214</sup> Centralised, reliable, cyber-secure & upgradable in-vehicle electronic control architectures for CCAM connected to the cloud-edge continuum.

<sup>215</sup> Cocreate, Embrace – grant agreement ID: [101147397](#).

<sup>216</sup> Diversify CCAM by integrating European cultural and regional variations in the design and implementation of citizen-friendly systems to foster mobility equity - grant agreement id: [101147484](#).

expected to report on results to the European Partnership ‘Connected, Cooperative and Automated Mobility’ (CCAM) in support of the monitoring of its KPIs.

Projects resulting from this topic are expected to apply the European Common Evaluation Methodology (EU-CEM) for CCAM<sup>217</sup>.

**HORIZON-CL5-2026-01-D6-04: Integration of human driving behaviour in the validation of CCAM systems (CCAM Partnership)**

<b>Call: Cluster 5 Call 01-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 5.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 5 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>218</sup></p>

Expected Outcome: Project results are expected to contribute to all of the following expected outcomes:

- Validated human behavioural models representing the variety of human driving behaviour in safety-relevant scenarios, shared through a common repository and to be used:
  - to define pass criteria/ assessment criteria for CCAM systems in type approval schemes, consumer testing campaigns and industrial development processes;

<sup>217</sup> See the evaluation methodology [here](#).

<sup>218</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

- o to design safe, human-like behaviour of CCAM systems that can be anticipated easily by other road users and is acceptable to both occupants and other road users.
- Application of such human behavioural models in the virtual safety validation of CCAM systems to realistically represent the behaviour of human-driven vehicles in closed loop simulations of mixed traffic, thereby reflecting the variety of human driving behaviour, including behaviour in complex real-world and emergency conditions.

**Scope:** The deployment of CCAM systems in mixed traffic will mean intense interaction with other road users such as the human drivers of other vehicles as well as pedestrians and riders of two-wheelers. These interactions (including implicit and explicit communication) will play a crucial role in the acceptance and thereby the penetration of CCAM systems in future road transport. CCAM systems will have to show safe and human-like driving behaviour, so that their decisions and actions can be anticipated easily by other road users, respecting the variety of typical driving behaviour across different countries as well as the need for CCAM systems to respect traffic rules and support road safety.

This will require validated models of explicit and implicit human driving behaviour to design and validate such system behaviour. These models will be needed in closed loop simulations of CCAM systems in mixed traffic to realistically represent the reactions of human drivers in other vehicles to the behaviour of a CCAM system. Models representing human driving behaviour shall be developed by the projects i4Driving<sup>219</sup> and BERTHA<sup>220</sup> under HORIZON-CL5-2022-D6-01-03<sup>221</sup> for selected fields of application, i.e. they will be calibrated for a limited number of scenarios. Bringing together and building upon the results of these projects – in particular a simulation library and an innovative methodology to account for uncertainty from i4Driving and a scalable, probabilistic driver behavioural model from BERTHA, research is needed to extend the fields of application that these projects are addressing with a focus on representing driver behaviour in a multitude of safety-critical scenarios, considering the variation and statistical distribution of human behavioural patterns and the factors influencing such behaviour, including the parallel execution of non-driving related tasks.

To achieve high degrees of robustness and applicability in a wide range of scenarios, detailed calibration and parameterisation is necessary, as driver behaviour depends on factors such as the road infrastructure, vehicle types, traffic conditions and rules, as well as regional influences and driver experiences / demographics, e.g., gender, age and other relevant social variables. Considering the deviation of average from ideal human driving behaviour, proposed actions must also validate the models for their extended fields of application, going well beyond the applications and degrees of validation accomplished by the above-mentioned projects under HORIZON-CL5-2022-D6-01-03. Proposed actions shall thus raise the technology readiness of these models from TRL 4 to TRL 5. Data for parameterisation and

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<sup>219</sup> Integrated 4D driver modelling under uncertainty, grant agreement ID: [101076165](#).

<sup>220</sup> BEhavioural ReplicaTion of Human drivers for CCAM, grant agreement ID: [101076360](#).

<sup>221</sup> Human behavioural model to assess the performance of CCAM solutions compared to human driven vehicles.

validation should be captured by monitoring real human drivers in driving simulators and/or real traffic considering what is happening inside and outside the vehicle.

Proposed actions shall integrate, to the extent possible, the validated models in the virtual validation and verification approaches as developed in the projects HEADSTART<sup>222</sup> and SUNRISE<sup>223</sup> and complemented by EU project SYNERGIES<sup>224</sup>. Successful integration needs to be demonstrated in various safety-relevant scenarios as provided by the action(s) funded under HORIZON-CL5-2023-D6-01-02<sup>225</sup>. Models should be shared via the federated data exchange platform for CCAM to be developed by an action under HORIZON-CL5-2025-D6-06<sup>226</sup>.

Proposals are encouraged to also explore additional fields of application of validated driver behaviour models, while the integration of relevant expertise from social sciences and humanities (SSH) is expected.

To achieve the expected outcomes, international cooperation is encouraged with research partners in Japan and the United States but also with other relevant strategic partners in third countries. Such cooperation should exploit synergies as far as possible in capturing data for the parametrisation and validation of behavioural models, while considering regional and cultural differences as well as specificities of respective road infrastructures.

This topic implements the co-programmed European Partnership on ‘Connected, Cooperative and Automated Mobility’ (CCAM). As such, projects resulting from this topic will be expected to report on results to the European Partnership ‘Connected, Cooperative and Automated Mobility’ (CCAM) in support of the monitoring of its KPIs.

Projects resulting from this topic are expected to apply the European Common Evaluation Methodology (EU-CEM) for CCAM<sup>227</sup>.

Projects funded under this topic are encouraged to explore potential complementarities with the activities of the European Commission's Joint Research Centre's Sustainable, Smart, and Safe Mobility Unit and, where appropriate, establish formal collaboration.

## **HORIZON-CL5-2026-01-D6-05: Approaches, verification and training for Edge-AI building blocks for CCAM Systems (CCAM Partnership)**

<b>Call: Cluster 5 Call 01-2026 (WP 2025)</b>	
<b>Specific conditions</b>	

<sup>222</sup> Harmonised European solutions for testing automated road transport, grant agreement id: [824309](#).

<sup>223</sup> Safety assUraNce fRamework for connected, automated mobIlity SystEms, grant agreement ID: [101069573](#).

<sup>224</sup> Real and synthetic scenarios generated for the development, training, virtual testing and validation of CCAM systems, grant agreement ID: [101146542](#).

<sup>225</sup> [EU Funding & Tenders Portal \(europa.eu\)](#)

<sup>226</sup> Federated CCAM data exchange platform.

<sup>227</sup> See the evaluation methodology [here](#).

<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 4.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 5 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>228</sup></p>

**Expected Outcome:** Project results are expected to contribute to all of the following expected outcomes:

- CCAM solutions - in hardware and software - with reduced power consumption, latency, and improved speed and accuracy, as domain specific adaptions of sector agnostic advancements in e.g. AI and/or cloud-edge-IoT technologies;
- Enhanced levels of safety, (cyber) security, privacy and ethical standards of data-driven CCAM functionalities by using e.g. edge-AI applications for CCAM;
- Approaches for well-balanced distributions of AI calculations for expanding use cases (e.g. collective perception, decision making and actuation) for connected, cooperative and automated driving applications (using a balanced mix of edge-based solutions<sup>229</sup>, cloud-enabled solutions and vehicle-central solutions), balancing speed and latency, energy use, costs, data sharing and storage needs and availability;
- Validated approaches incorporating Edge-AI solutions into the action chain from perception and decision-making up to actuation of advanced CCAM functionalities - both on-board and on the infrastructure side - for systemic applications such as traffic management and remote control, as well as tools and approaches for training of such functionalities, which require optimised and verified edge-AI models.

<sup>228</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

<sup>229</sup>

**Scope:** CCAM-enabled vehicles are constantly sensing their surroundings on road conditions, location, nearby vehicles and infrastructure. Such data is shared in real-time, while data from other sources is received. This needs powerful and optimised large data processing algorithms, which requires large amounts of computing power, data processing, real-time operation and high levels of security. However, most existing AI computing tasks for automated vehicle applications are relying on general-purpose hardware, which has limitations in terms of power consumption, speed, accuracy, scalability, memory footprint, size and cost. Hardware advancements driven by initiatives such as the Chips JU calls must be complemented by significant efforts to optimise AI algorithms for CCAM functionalities, ensuring their efficient performance on edge-specific hardware.

To encompass CCAM solutions in future steps towards e.g., the Software Defined Vehicle, this dual approach on AI advancements and hardware advancements is essential. Complementarities with projects funded under Cluster 4 “Digital Industry and Space” of Horizon Europe should also be considered where appropriate, especially in translating sector-agnostic innovations to the specificities of CCAM applications. Requirements on AI algorithm optimisation, latency, on-board energy availability, solutions to gain unbiased datasets for AI training, Electronic Control Unit (ECU) capacity and on potential safety-critical scenarios should be considered to ensure the timely triggering of actions, and in a later stage, anticipatory driving. Solutions shall use, as far as possible, building blocks, interfaces, and tools from projects of the Software-Defined Vehicle of the Future (SDVoF) initiative.

Edge-AI involves deploying AI algorithms on edge computing devices, which are hardware systems constrained in proximity to the data source where they operate. This is done without relying on remote resources for the computational efforts. It thus facilitates real-time insights, responses and triggering of actions, with reduced costs as the processing power close to the application is used, greatly reducing networking costs. Combining AI with edge-AI can facilitate stable solutions to include the full activity chain from sensing, perception, decision-making up to actuation of advanced CCAM solutions, gaining speed and resilience which are essential in safety-critical situations.

To successfully overcome these challenges, proposed actions are expected to address all of the following aspects:

- For next major advancements in AI applications in CCAM solutions, huge AI applications need to fit into limited hardware, to make it fit for purpose. Edge-AI devices often have limited computational resources, making it challenging to deploy large and complex AI models. Thus, it is essential to develop and reshape approaches and building blocks for CCAM solutions, viable to be run on edge-hardware. Use cases for the approaches and building blocks should focus on time-critical applications (such as the chain from (collective) perception, decision making and actuation of functionalities) and can be linked to the activities and results from projects AI4CCAM<sup>230</sup> and AIthena<sup>231</sup>, funded under HORIZON-CL5-2022-D6-01-04<sup>232</sup>;

<sup>230</sup>

Trustworthy AI for CCAM, grant agreement ID: [101076911](https://ec.europa.eu/programmes/horizon-europe/projects/101076911).

- Develop optimised edge-AI algorithms and demonstrate their applicability and scalability, using real-world CCAM scenarios such as in the databases resulting from projects funded under HORIZON-CL5-2023-D6-01-02<sup>233</sup>. The development and demonstration use case should include in-vehicle perception and understanding, such as object detection, segmentation, road surface tracking, sign and signal recognition, etc. Decision making and actuation of countermeasures is to be part of the chain of actions. The approaches for these building blocks and enabling technologies should facilitate a quick uptake in adjacent or following projects;
- Optimisation of the models for edge deployment. This involves adjusting the size and complexity of models to allow it to run on the relevant edge devices and include training and verification approaches. Techniques such as model quantization, pruning, and knowledge distillation can be used to reduce the size of AI models without significant loss in performance. Additionally, over-the-air (OTA) updates can be used to manage and update models across a fleet of devices efficiently;
- Develop tools and approaches for edge-AI model monitoring, to ensure that edge-AI systems continue to operate as expected and ensure resilience to failure conditions or attacks, and monitoring model outputs to ensure they are accurate even as real-life conditions and datasets change.

The research will require due consideration of cyber security, connectivity and both personal and non-personal data protection issues, including the GDPR, and ensure that gender and other social categories (such as but not limited to disability, age, socioeconomic status, ethnic or racial origin, sexual orientation, etc.), and their intersections are duly considered where appropriate, as well as Explainable AI to enhance trust and regulatory compliance including alignment with the AI Act.

In order to achieve the expected outcomes, international cooperation is encouraged in particular with Japan and the United States but also with other relevant strategic partners in third countries. Such cooperation should exploit synergies in edge AI approaches for mobility and for CCAM, as well as its integration into the vehicle architecture.

This topic implements the co-programmed European Partnership on ‘Connected, Cooperative and Automated Mobility’ (CCAM). As such, projects resulting from this topic will be expected to report on results to the European Partnership ‘Connected, Cooperative and Automated Mobility’ (CCAM) in support of the monitoring of its KPIs.

Projects resulting from this topic are expected to apply the European Common Evaluation Methodology (EU-CEM) for CCAM<sup>234</sup>.

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<sup>231</sup> AI-based CCAM: Trustworthy, Explainable, and Accountable, grant agreement ID: [101076754](#).

<sup>232</sup> Artificial Intelligence (AI): Explainable and trustworthy concepts, techniques and models for CCAM.

<sup>233</sup>

<sup>234</sup> See the evaluation methodology [here](#).

Projects funded under this topic are encouraged to explore potential complementarities with the activities of the European Commission's Joint Research Centre's Sustainable, Smart, and Safe Mobility Unit and, where appropriate, establish formal collaboration.

**HORIZON-CL5-2026-01-D6-06: Federated CCAM data exchange platform (CCAM Partnership)**

<b>Call: Cluster 5 Call 01-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 4.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>235</sup>.</p>

Expected Outcome: Project results are expected to contribute to all of the following expected outcomes:

- Overview of CCAM-specific limitations of current data exchange solutions and existing dataspaces related to interfaces, harmonised ontologies and taxonomies, standards, formats, monetisation / compensation;
- Mapping of information and reference data needs for KPIs collected by Member States and Associated Countries (where relevant and to the extent possible), related to impacts of CCAM technologies and solutions;

<sup>235</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

- Federated sustainable CCAM Data Exchange Platform that facilitates sharing of data for both large-scale demonstrations and deployment, interfacing existing data spaces and improving the exchange, availability, and accessibility of data for the development, testing and deployment of CCAM services (including but not limited to Digital Twins, digital scenario representations, safety assurance and validation, ADS regulation monitoring, driver behaviour, AI model training, and the collection of national/EU level statistics and Key Performance Indicators);
- Proposed governance structure for the Data Exchange Platform with a sustainability plan and viable business model.

Scope: Data sharing plays a pivotal role in supporting R&I, enabling deployment, and enhancing the competitiveness of the CCAM industry. Within the realm of data sharing, there are two distinct categories of data that are particularly pertinent: mobility data, and data for research and development. The common European mobility data space<sup>236</sup> aims to facilitate mobility data access and sharing, and is supported by projects, notably from the Digital Europe Programme. This mobility data space will facilitate the sharing of data related to mobility patterns, traffic flow, and other macroscopic aspects that are essential for the development of CCAM solutions. Within the research, testing and deployment of CCAM solutions for the automotive as well as infrastructure sectors, there is a need for a dedicated data space tailored specifically to the requirements of CCAM stakeholders. This CCAM Data Space demands a more granular and extensive array of data to cater to the needs of both Tier X suppliers, Original Equipment Manufacturers (OEMs), traffic managers and infrastructure providers, particularly in terms of vehicle and traffic safety considerations. Specific aspects related to ongoing regulatory developments would need to be considered (e.g. Automated Driving Systems and General Safety regulations, adaption of type approval to the AI Act, including trustworthy AI integration).

Several data spaces exist or are being developed in Europe for CCAM in specific R&I initiatives. The FAME<sup>237</sup> project has released a CCAM Data Sharing Framework (DSF) 2.0 describing best practices in data sharing and will develop a CCAM Federated Data Space as a proof of concept to facilitate the exchange of research and test data across R&I projects. Several CCAM Partnership R&I projects expressed interest in making data available and reusing data from other projects through the FAME Test Data Space, once it will be operational. The scenario-based validation approach for safety argumentation in highly automated functions will result in an integration of various scenario databases facilitated by a federated layer, as developed in project SUNRISE<sup>238</sup> and in projects funded under topic HORIZON-CL5-2023-D6-01-02<sup>239</sup>. However, this integration falls short of constituting a comprehensive Data Space approach, both for new data sets and extensions of existing datasets. To achieve full Data Space functionality for CCAM, significant enhancements are

<sup>236</sup> [Creating a common European mobility data space - European Commission \(europa.eu\)](https://ec.europa.eu/europort/en/creating-common-european-mobility-data-space)

<sup>237</sup> Framework for coordination of Automated Mobility in Europe, grant agreement ID: [101069898](https://ec.europa.eu/europort/en/101069898).

<sup>238</sup> Safety assUraNce fRamework for connected, automated mobIlity SystEms, grant agreement ID: [101069573](https://ec.europa.eu/europort/en/101069573).

<sup>239</sup> Generation of scenarios for development, training, virtual testing, and validation of CCAM systems.

required in terms of developing connectors, APIs, and protocols for seamless data exchange. Additionally, there is a need to refine user profile management systems and establish robust contractual frameworks to govern data access and usage rights. A generic data space blueprint and building blocks are being developed and governed by the Data Space Support Centre<sup>240</sup>. In parallel, the DeployEMDS<sup>241</sup> builds a decentralised technical infrastructure and common governance mechanisms for urban mobility use cases in 9 cities and regions across Europe.

Consequently, substantial efforts are necessary to fully integrate these approaches into a cohesive and efficient Data Space environment that can effectively support the diverse needs of the CCAM research community and industry. Moreover, extensive datasets are also indispensable for the development of low-level modules such as driver monitoring systems, perception systems, and decision-making algorithms, as well as for sensors like GNSS, radar, cameras, and lidar. While projects like AIthena<sup>242</sup> and AWARE2ALL<sup>243</sup> have generated valuable datasets, the lack of centralised storage and access hampers their utility. Therefore, there is a strong need to incorporate such datasets into a unified CCAM Data Space that is aligned with the data space blueprint, taking advantage of the common building blocks.

By establishing robust interfaces, ontologies, and data management architectures, the CCAM research community and industry can effectively utilise and repurpose existing data, thereby reducing costs, and facilitating the development and validation of CCAM solutions, including the creation of digital twins through synthetic data. The enhanced sharing of data across the CCAM stakeholders should also benefit national authorities, and operators in their efforts to collect KPIs to monitor wider impacts of CCAM solutions including on safety, economy, and society.

Proposed actions for this topic are expected to address all of the following aspects:

- Identify how to further evolve the data spaces for CCAM applications, connecting existing dataspaces and bridging data gaps;
- Identify harmonisation and standardisation needs for taxonomies, interfaces, and data formats to push CCAM data exchange and extend and implement the CCAM taxonomies in the CCAM Test Data Space;
- Identify information needs and reference data for KPIs collected from Member States and Associated Countries (where relevant and to the extent possible) of i.e. high-level socio-economic statistics, accidents, infrastructure, vehicles;
- Establish a Federated CCAM Data Exchange Platform with tools and governance, including a viable business model to ensure the durability of the platform, which facilitates sharing of data for industry, social partners, authorities and academia that are

<sup>240</sup> Data Spaces Blueprint | Version 0.5 | September 2023 - Blueprint - Data Spaces Support Centre (dssc.eu)

<sup>241</sup> See for more information: <https://deployemds.eu/>

<sup>242</sup> AI-based CCAM: Trustworthy, Explainable, and Accountable, grant agreement ID: [101076754](https://ec.europa.eu/programmes/horizon-europe/projects/101076754).

<sup>243</sup> Safety systems and human-machine interfaces oriented to diverse population towards future scenarios with increasing share of highly automated vehicles, grant agreement ID: [101076868](https://ec.europa.eu/programmes/horizon-europe/projects/101076868).

supporting specific use cases related to: large-scale demonstrations, generation and maintenance of digital twins and representation of scenarios (for development or validation), performance and safety assessment, driver behaviour data from real and synthetic driving conditions, ADS regulation monitoring, AI model training, and common information source for national/EU level statistics and Key Performance Indicators;

- Identify and describe methods/algorithms/processes to refine and use data for the specific use cases tackled by the Platform;
- Identify the effects of the EU General Data Protection Legislation (GDPR) on AI learning workflows and possible mitigation measures.

A strong alignment with the common European mobility data space and related projects<sup>244</sup> is required. The work should ensure coherence and interoperability with other common European data spaces, especially regarding its cross-sectoral blueprint and building blocks, by aligning with the Data Spaces Support Centre and by using, as far as possible, the smart cloud-to-edge middleware platform Simpl<sup>245</sup>. The work should build on the outcomes of the FAME project and the FAME Test Data Space ([Data Sharing - Connected Automated Driving](#)). Finally, links with related activities under the future European Digital Infrastructure Consortium ([EDIC](#)) for Mobility and Logistics Data and cooperation with the CCAM Partnership's States Representative Group (SRG) are required. Particular attention should be dedicated towards establishing interoperability standards for data sharing within and across the data ecosystems, through the implementation of the FAIR data principles and leveraging already adopted practices, especially in relevant European common data spaces.

In order to achieve the expected outcomes, international cooperation is encouraged in particular with Japan and the United States but also with other relevant strategic partners in third countries.

This topic implements the co-programmed European Partnership on ‘Connected, Cooperative and Automated Mobility’ (CCAM). As such, projects resulting from this topic will be expected to report on results to the European Partnership ‘Connected, Cooperative and Automated Mobility’ (CCAM) in support of the monitoring of its KPIs.

Projects resulting from this topic are expected to apply the European Common Evaluation Methodology (EU-CEM) for CCAM<sup>246</sup>.

## Multimodal transport, infrastructure and logistics

Proposals are invited against the following topic(s):

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<sup>244</sup> The awarded proposal should build on the outcomes of the preparatory action PrepDSpace4Mobility and the EMDS study under CEF. It should collaborate and align the deployEMDS project and the future action under call DIGITAL-2024-CLOUD-AI-06-MOBSPACE.

<sup>245</sup> More information [here](#).

<sup>246</sup> See the evaluation methodology [here](#).

**HORIZON-CL5-2026-01-D6-07: Innovative construction and maintenance, with the use of new materials and techniques, for resilient and sustainable transport infrastructure**

<b>Call: Cluster 5 Call 01-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 11.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 22.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 7 by the end of the project – see General Annex B. Activities may start at any TRL.

Expected Outcome: Project results are expected to contribute to all of the following outcomes:

Demonstration of combined solutions for infrastructure construction that achieve the following targets:

- At least 50% of the construction materials used are recycled or sourced from recycled materials;
- Reduced pollutant emissions by at least 30% considering the entire life cycle of the infrastructure;
- Reduced degradation of ecosystems and fragmentation of habitats during construction, maintenance, operation and decommissioning of transport infrastructure (thereby contributing to maintaining biodiversity);
- Increased climate resilience of infrastructure to extreme weather and human caused events, assuring at least 80% capacity at network level during the disruptions;
- Structured analysis and recommendations on the need for EU standards in construction, inspection, maintenance and deconstruction, contributing to the decarbonisation and increased resilience of transport infrastructure;
- Guiding document on the necessary adaptations to public procurement rules that contribute to including clear sustainability and resilience award criteria.

Scope: The overarching policy background is the European Green Deal, which aims to achieve climate neutrality by 2050. In the transport area, this translates into a 90% reduction of transport-related greenhouse gas emissions by 2050<sup>247</sup>. To deliver the European Green

<sup>247</sup>

[Transport and the Green Deal - European Commission \(europa.eu\)](https://ec.europa.eu/transport-and-green-deal-european-commission-europa.eu)

Deal, there is a need to revise and upgrade numerous policies, including those for transport and large-scale infrastructures.

The EU Sustainable and Smart Mobility Strategy<sup>248</sup> (SSMS), which translates this overall transport target into actions, states that infrastructure must be adapted to climate change and made resilient to disasters. In line with the SSMS, it is also important that such infrastructure should rely on clean and decarbonised energy sources, notably renewable energy, as well as on a modernised grid.

Research in this topic should provide knowledge and technical solutions to a triple challenge: (1) limiting emissions of transport infrastructures; (2) making them more resilient to climate change; and (3) addressing environmental and biodiversity aspects. Projects should cover the entire life cycle of transport infrastructures, covering overall emissions from sourcing of materials, construction, maintenance, operation and decommissioning of the infrastructure.

Proposals should address all of the following aspects:

- Development of new methods and techniques to construct, manage, maintain and repair (including self-repair) transport infrastructures, in order to increase climate resilience and lower emissions;
- Assessment of solutions considering the principles of circularity and taking into account the entire life cycle assessment (LCA) approach;
- Cost-benefit analysis (CBA) of the solutions considering the entire life cycle of the infrastructure and accompanying business plans for their implementation;
- Application of innovative materials (e.g. green asphalt, green cement, carbon sinks) that enable transport infrastructures to become more resilient, more sustainable and emit less pollutants;
- Validation of all the proposed solutions and proofs of concepts is to be carried out in at least two large-scale demonstrations. The demonstrations should cover at least two different transport infrastructure types (e.g., road, rail, waterborne, airport) which are located on at least two different Trans European Transport Network (TEN-T) corridors. The demonstrations should also cover different environments and phases of the infrastructure life cycle (e.g. design, construction, maintenance, decommissioning);
- Analysis of EU national and international standards in construction, inspection, maintenance and deconstruction, contributing to the decarbonisation and increased resilience of transport infrastructure;
- Design of green, sustainable and innovative public procurement methods, contributing to lowering the environmental footprint, resources, and material consumption;

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<sup>248</sup> [https://transport.ec.europa.eu/document/download/be22d311-4a07-4c29-8b72-d6d255846069\\_en?filename=2021-mobility-strategy-and-action-plan.pdf](https://transport.ec.europa.eu/document/download/be22d311-4a07-4c29-8b72-d6d255846069_en?filename=2021-mobility-strategy-and-action-plan.pdf)

- Demonstration of sustainable and climate resilient infrastructure with nature-based solutions (NBS<sup>249</sup>), minimising the negative effects on the environment, including the degradation of ecosystems, the fragmentation of habitats and the loss of biodiversity.

The projects should develop clear indicators with baselines and quantified targets in support of the expected outcomes that are monitored for each demonstration site. With regards to the expected outcomes, projects should take into account expected technological developments and policy implementation (e.g. revised TEN-T regulation), multi-disciplinary adaptive capacity in line with the European Climate Risk Assessment<sup>250</sup> (EUCRA) and the Commission Communication on Managing Climate Risks<sup>251</sup>, in particular cascading impacts across sectors.

Proposals should consider and build on results from previous calls on resilient and sustainable infrastructure and standards,<sup>252</sup> and should incorporate relevant EU guidance on the development and management of European transport infrastructures. Proposals should also build on previous results from projects on advanced materials, sensor technology, digitalisation, asset management, decision support and automation in the construction and maintenance of infrastructures. If the proposed activities and solutions involve the use of artificial intelligence (AI) systems and/or techniques, the proposal is expected to demonstrate that robustness of the solution.

#### **HORIZON-CL5-2026-01-D6-08: Accelerating freight transport and logistics digital innovation**

<b>Call: Cluster 5 Call 01-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of between EUR 7.00 and 8.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 15.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.

Expected Outcome: The proposals are expected to contribute to all the following outcomes:

<sup>249</sup> [https://research-and-innovation.ec.europa.eu/research-area/environment/nature-based-solutions\\_en](https://research-and-innovation.ec.europa.eu/research-area/environment/nature-based-solutions_en)

<sup>250</sup> [European Climate Risk Assessment — European Environment Agency \(europa.eu\)](https://ec.europa.eu/eropa/europa/europa_en)

<sup>251</sup> [EUR-Lex - 52024DC0091 - EN - EUR-Lex \(europa.eu\)](https://eur-lex.europa.eu/eli/other/2024/091)

<sup>252</sup> <https://im-safe-project.eu/>

- Extended functionalities of electronic Freight Transport Information (eFTI) platforms beyond the required actions forming part of the implementation of Regulation 2020/1056<sup>253</sup> for:
  - new use cases, solutions and applications, enabling harmonised electronic business-to-business (B2B) information sharing and exchange in multimodal logistics chains and hubs such as those related to GHG reporting, sustainability claims and other actions leveraging efficient and green freight operations in the supply chain;
  - complementary applications and services for electronic business-to-authority (B2A) information sharing aimed to support the implementation by businesses of relevant Union regulatory frameworks in transport or in other relevant policy fields, such as in the context of smart enforcement, statistics, customs, e-invoicing, , sustainability reporting, data spaces, GHG and external costs calculators;
- Best practices to boost and accelerate the adoption of eFTI framework and data sharing innovations by companies and in particular by SMEs are established;
- Improved efficiency in operations and freight transport, through the provision of advanced digital connectivity and interoperability of the information shared electronically between actors in both B2B and B2A perspective, compared to the baseline defined in the start of the project, is demonstrated and quantified;
- Reduced administrative burden and costs associated with B2B data sharing and B2A regulatory and non-regulatory reporting are demonstrated and quantified.

Scope: eFTI platforms established in line with Regulation 2020/1056 will play a central role in facilitating the implementation of business-to-authority (B2A) information exchange processes related to multimodal transport of goods. In line with the Regulation's requirements, common specifications for a single comprehensive data set and harmonised protocols for data sharing will ensure interoperability of the information shared electronically between actors, and the requirements for rights-based access-control system will establish safeguards for cybersecurity and trust. The use of electronic means to exchange regulatory information is also expected to reduce administrative costs for economic operators, to enhance the efficiency of freight transport services and to facilitate green transformation of the logistics sector.

Therefore, given their potential, apart from specific B2A functionalities, eFTI platforms could also serve as an enabler for other universal, open and affordable solutions and tools to achieve digital interconnectivity of logistics systems including in a business-to-business (B2B) perspective.

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<sup>253</sup> Regulation (EU) 2020/1056 of the European Parliament and of the Council of 15 July 2020 on electronic freight transport information; <https://eur-lex.europa.eu/eli/reg/2020/1056/oj>.

The proposals should unlock the potential of eFTI platforms for further functionalities, beyond the scope of Regulation 2020/1056, to new B2B services and applications as well as other B2A uses.

Proposals will have to refer, as a core principle, to the legislative framework and specific technological solutions provided through Regulation 2020/1056, while duly reflecting the latest technological state of the art for electronic information exchange. Where relevant, and especially in B2B perspective, they will have to apply and build upon the concepts and solutions developed in other Union initiatives aimed to facilitate data sharing and exchange in transport, the [Digital Transport and Logistics Forum \(DTLF\)](#) and the [European mobility data space \(EMDS\)](#).

Proposals must not put forward any type of architecture, federation of platforms or similar, as these are already delivered by eFTI and DTLF, and should not develop functionalities already required in the current scope of eFTI Regulation. Instead, they are expected to leverage and/or extend functionalities of eFTI platforms that are in operation at the time of the implementation of the project, to ensure the effective implementation of new use cases.

Building on the functionalities, requirements and implementation specifications for eFTI platforms provided for in the eFTI Regulation and its implementing and delegated acts, the proposals should address all of the following aspects:

- Develop technical solutions and tools, at least at the level of operational prototype demonstration (TRL7), for complementary applications and services for electronic B2A information sharing;
- Develop universal, open and affordable solutions and tools to enable electronic B2B information sharing in collaborative logistics processes. The proposed solutions should be implemented with minimal integration effort for industrial stakeholders, for instance through the usage of AI to facilitate data and information interoperability.
- Develop solutions and tools to facilitate SMEs engagement in the digital freight transport and logistics ecosystem and the adoption of solutions by SMEs.
- Define multiple use cases, services and application of eFTI platforms for B2B and B2A processes duly accounting of relevant existing solutions and projects and identifying specific barriers to interoperability and universal adoption.
- Identify and define relevant data to be added to the existing eFTI common dataset to support the new use cases, services and functionalities; while addressing aspects of data sovereignty, data privacy and cybersecurity, pursuant to the relevant Union legislation;
- Assess and provide recommendations for B2B framework arrangements, including standard data exchange contracts, identification/authentication and authorization to ensure trusted operations in data sharing and exchange in freight transport and logistics;

- Define and seek synergies with relevant EU frameworks and policies related to the exchange of transport emissions data (such as new Commission's proposal for the Regulation on CountEmissions EU<sup>254</sup>, the Corporate Sustainability Reporting Directive<sup>255</sup>, and other relevant Union acts.) to facilitate their effective and harmonised implementation, including through the establishment of an open source emissions calculators, as well as the exploitation of data sharing frameworks for carbon reporting between operators in the same supply chain;
- Assess the interdependencies and needs with horizontal Union strategies and legislation such as GDPR<sup>256</sup>, digital identities<sup>257</sup>, data spaces<sup>258</sup>, AI act<sup>259</sup>, Data Governance Act<sup>260</sup>, Cybersecurity Act<sup>261</sup>; identify best practices and provide recommendations for compliance.
- Define and test B2A and B2B solutions and use cases in at least 2 demonstration environments/ecosystems involving platforms and users. B2B use cases have to be led by industry stakeholders, in particular shippers and logistics service providers (e.g. freight forwarders, transportation companies). B2A use cases have to be developed in cooperation with industry stakeholders, researchers and public administrations, including statistical offices.
- Identify and develop best practices, map solutions and value streams. Provide recommendations on incentives, capability building, training and technology adoption support schemes as well as trust building mechanisms – to facilitate, encourage and

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<sup>254</sup> Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the accounting of greenhouse gas emissions of transport services (Text with EEA relevance); <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52023PC0441>

<sup>255</sup> Directive (EU) 2022/2464 of the European Parliament and of the Council of 14 December 2022 amending Regulation (EU) No 537/2014, Directive 2004/109/EC, Directive 2006/43/EC and Directive 2013/34/EU, as regards corporate sustainability reporting (Text with EEA relevance); <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32022L2464>

<sup>256</sup> Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation); <https://eur-lex.europa.eu/eli/reg/2016/679/oj>

<sup>257</sup> Regulation (EU) 2024/1183 of the European Parliament and of the Council of 11 April 2024 amending Regulation (EU) No 910/2014 as regards establishing the European Digital Identity Framework; <https://eur-lex.europa.eu/eli/reg/2024/1183/oj>

<sup>258</sup> <https://digital-strategy.ec.europa.eu/en/policies/data-spaces>

<sup>259</sup> Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act) (Text with EEA relevance); <https://eur-lex.europa.eu/eli/reg/2024/1689/oj>

<sup>260</sup> Regulation (EU) 2022/868 of the European Parliament and of the Council of 30 May 2022 on European data governance and amending Regulation (EU) 2018/1724 (Data Governance Act) (Text with EEA relevance); <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32022R0868>

<sup>261</sup> Regulation (EU) 2019/881 of the European Parliament and of the Council of 17 April 2019 on ENISA (the European Union Agency for Cybersecurity) and on information and communications technology cybersecurity certification and repealing Regulation (EU) No 526/2013 (Cybersecurity Act) (Text with EEA relevance); <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32019R0881>

accelerate the adoption of eFTI platforms and data sharing and exchange innovations by companies and in particular by SMEs.

**HORIZON-CL5-2026-01-D6-09: Reliable data and practices to measure and calculate transport emissions in multimodal transport chains**

<b>Call: Cluster 5 Call 01-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 3.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 3.50 million.
<i>Type of Action</i>	Coordination and Support Actions
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>262</sup></p>

Expected Outcome: Project results are expected to contribute to all the following outcomes:

- Input is provided for the implementation of the existing and forthcoming Union's regulatory initiatives related to measurement, calculation and reporting of emissions in transport, such as Regulation (EU) 2023/1805 (FuelEU Maritime)<sup>263</sup>, Regulation (EU) 2023/2405 (ReFuelEU Aviation)<sup>264</sup>, and the recent Commission's proposal for the Regulation on the accounting of greenhouse gas emissions of transport services (CountEmissions EU)<sup>265</sup>. Consistency with data and methodologies in current energy

<sup>262</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

<sup>263</sup> Regulation (EU) 2023/1805 of the European Parliament and of the Council of 13 September 2023 on the use of renewable and low-carbon fuels in maritime transport, and amending Directive 2009/16/EC

<sup>264</sup> Regulation (EU) 2023/2405 of the European Parliament and of the Council of 18 October 2023 on ensuring a level playing field for sustainable air transport

<sup>265</sup> COM(2023) 441 final

legislation such as Directive (EU) 2023/2413 (Renewable Energy Directive)<sup>266</sup> must be ensured;

- Methodological components are developed and proposed to complement the methodology for accounting emissions provided under the Commission's proposal on CountEmissions EU.

Scope: Greenhouse gas (GHG) emissions from transport represent around 25% of total man-made GHG emissions and continue to grow. The negative impact of these is further strengthened by the existence of other external costs of transport, including air pollution, noise, congestion and accidents. The EU, Member States and industry have made considerable efforts to reduce transport-related GHG emissions and associated external costs.

Accurate and reliable information on emissions is an important tool to increase effectiveness of specific emission reduction measures undertaken by public authorities and businesses. Over the past 15 years, a lot of progress has been made at EU level and globally through new regulatory actions and continuing collaboration between actors to improve the transparency of transport GHG emissions and external costs monitoring. This is manifested through:

- Regulatory initiatives including Regulation (EU) 2023/1805 (FuelEU Maritime)<sup>267</sup>, Regulation (EU) 2023/2405 (ReFuelEU Aviation)<sup>268</sup>, Regulation (EU) 2015/757 (EU MRV)<sup>269</sup> and especially, the recent Commission's proposal for the Regulation on the accounting of greenhouse gas emissions of transport services (CountEmissions EU)<sup>270</sup>, and Directive (EU) 2023/2413 (Renewable Energy Directive);
- Relevant EU research projects, including "Carbon Footprint of Freight Transport" (COFRET), "Logistics Emissions Accounting & Reduction Network" (LEARN) and the on-going "Creating Legitimate Emission Factors for Verified GHG Emission Reductions in Transport" (CLEVER)<sup>271</sup>;
- Standardisation work, including ISO 14083, the official international standard developed between November 2019 and October 2022 and published in March 2023 as part of the 14000 family of ISO GHG-related standards<sup>272</sup>;
- Regular updates of the Handbook on the External Costs of Transport<sup>273</sup>;

<sup>266</sup> Directive (EU) 2023/2413 of the European Parliament and of the Council of 18 October 2023 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652

<sup>267</sup> Regulation (EU) 2023/1805 of the European Parliament and of the Council of 13 September 2023 on the use of renewable and low-carbon fuels in maritime transport, and amending Directive 2009/16/EC

<sup>268</sup> Regulation (EU) 2023/2405 of the European Parliament and of the Council of 18 October 2023 on ensuring a level playing field for sustainable air transport

<sup>269</sup> Regulation (EU) 2015/757 of the European Parliament and of the Council of 29 April 2015 on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport, and amending Directive 2009/16/EC

<sup>270</sup> COM(2023) 441 final

<sup>271</sup> <https://emissionfactors.eu/>

<sup>272</sup> This standard has also been formally adopted by the European Committee for Standardisation (CEN) under the reference CEN ISO 14083

- Industry initiatives, such as the Global Logistics Emissions Council (GLEC) Framework, the industry-led guideline for GHG calculation and reporting in the global logistics sector.

Building on the initiatives listed above, proposals should undertake further work to ensure that:

- The full climate impact of transport operations is covered in a comprehensive and consistent way;
- Relevant open items identified in the emissions accounting reference methodology set out under the Commission's proposal on CountEmissions EU can be scientifically clarified and closed;
- Any detailed tweaks to the methodology that have come to light through application can be developed and tested in view of the implementation of the CountEmissions EU framework;
- New technologies, such as generative Artificial Intelligence, are considered in developing datasets and methodologies;
- Relevant data is available for the proper implementation and seamless integration of requirements set in other EU climate related legislation in transport, including Regulations on Fuel EU Maritime, ReFuelEU Aviation, EU MRV, and Regulation (EU) 2020/1056 on electronic freight transport information<sup>274</sup>.

The Action will play a central role in supporting implementation and further development of Union's frameworks aimed to tackle emissions in transport. However, the Action should also facilitate alignment between EU policy development and market implementation, especially towards enabling market-based accounting approaches that would support proactive investment in low emission fuels and associated transport services.

The proposals should address all of the following aspects:

- Explore, assess and establish the state of the art regarding issues of measuring and calculating specific types of transport-related emissions for which there is no clear consensus on the market, in particular:
  - black carbon emissions, which primarily result from the combustion of fossil fuels in compression ignition engines;
  - radiative forcing, which has been suggested as having a strong supplementary climate impact at high altitude and is already included in an inconsistent manner across some, but not all, transport GHG reporting programs;

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<sup>273</sup> <https://op.europa.eu/en/publication-detail/-/publication/9781f65f-8448-11ea-bf12-01aa75ed71a1>

<sup>274</sup> Regulation (EU) 2020/1056 of the European Parliament and of the Council of 15 July 2020 on electronic freight transport information

- o GHG emissions from vehicle manufacturing and scrappage, which, although not directly linked to transport operations, do contribute to overall life cycle transport emissions;
- o GHG emissions that result from the installation of transport infrastructure, which would need to include the definition of rules for the combination of operational and life cycle emission calculations into a meaningful and consistent presentation format;
- o GHG emissions related to the maintenance operations associated with transport operations that are currently excluded;
- o GHG emissions from information and communication technology (ICT) equipment and data servers that support the delivery of transport operations.

- Clarify specific methodological issues for enabling more accurate quantification of emissions and setting proper incentives towards efficient and sustainable transport options, addressing in particular:
  - o a detailed methodology for GHG emissions stemming from temperature-controlled transport and cool chain operations;
  - o allocation of GHG air transport emissions across passengers and freight transported on the same aircraft.
- Based on relevant European/national/sectorial repositories, explore, assess and contribute to an EU core dataset of default values for GHG emissions intensity of transport services, including for supporting relevant EU regulatory initiatives (such as CountEmissions EU);
- Building on the results of the CLEVER project, where relevant, update the list of applicable GHG emission factors for emissions stemming from energy production, distribution and use, in particular in the context of relevant EU regulatory initiatives (such as CountEmissions EU);
- Define R&I gaps on emissions accounting of transport and provide scientifically sound recommendations to address those gaps to improve the existing GHG emissions measuring framework.

The project's main governance (e.g. Steering Group, Advisory Board) is expected to provide for direct involvement of all relevant stakeholders, as well as relevant European Commission services.

Mechanisms to ensure coordination between other ongoing or selected projects (e.g. CLEVER) during their implementation should be put in place where applicable.

**HORIZON-CL5-2026-01-D6-10: Integrating inland waterway transport in smart shipping and multimodal logistics chains**

<b>Call: Cluster 5 Call 01-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 8.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 16.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.

Expected Outcome: Project results are expected to contribute to all of the following expected outcomes:

- Enhanced solutions and tools to better integrate inland waterway transport (IWT) into the overall logistic chains and increase the modal share of inland waterway transport, are developed and demonstrated in use cases in line with the objectives set up in NAIADES III<sup>275</sup>;
- Gains (compared to the baseline defined in the beginning of the project) in terms of operational efficiency, as well as environmental and social impact from the integration of IWT in multimodal logistics chains, are clearly identified, demonstrated and measured;
- Recommendations for an EU regulatory framework on harmonised smart shipping at EU level, as well as input for related standardisation, harmonisation and amendments to Inland Water Transport Digitalisation Vision to reflect findings from the project;
- Stakeholder engagement and communication campaigns and events to increase visibility and use of IWT are organised.

Scope: While the increased use of sustainable transport modes and multimodal solutions are critical levers for transport, logistics and supply chain decarbonisation, and despite obvious environmental advantages, the modal share of the EU IWT sector has remained below expectations over the last decades. The seamless integration of inland waterway transport in multimodal supply chains requires the physical and digital connection to other land transport modes and maritime transport. Digitalisation is not a goal in itself but an important supporting development required to remain competitive and to improve the connectivity to ports, other

<sup>275</sup>

[eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0324](http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0324) COM(2021) 324 final

transport modes and the clients (e.g. to keep the direct costs low and to allow synchromodal solutions). Digital interconnectivity (with logistics systems and other digital platforms for transport) is crucial to increase the modal share of IWT in multimodal logistics chains and to be able to significantly contribute to the modal shift goals as presented in the Sustainable and Smart Mobility Strategy<sup>276</sup>.

Proposals will have to focus on the integration of smart vessels, smart infrastructure, smart data and smart governance in multimodal logistics chains. The proposals should address all of the following aspects:

- Building on the results of previous and on-going Horizon 2020, Horizon Europe and Connecting Europe Facility (CEF) funded projects, identify, develop and test robust technical and operational solutions and tools (also exploring innovative technologies such as generative Artificial Intelligence) to connect physically and digitally IWT to existing land and waterborne multimodal logistics chains for a sustainable, efficient, safe, resilient, automated IWT with a view to synchromodal transport;
- Define and develop key parts of the IWT-related aspects of a common framework for multi-modal data sharing, while enabling compatibility with legacy systems; building upon the concepts and solutions developed in other Union initiatives aimed to facilitate data sharing in transport, such as the Digital Transport and Logistics Forum (DTLF), the European mobility data space (EMDS), the electronic Freight Transport Information regulation; and considering high value datasets, the revised Intelligent Transport Systems (ITS) Directive<sup>277</sup> and River Information Services (RIS) Directive. Proposals must not propose any type of new platforms or similar but are expected to leverage existing frameworks or platforms to ensure effective use case implementation (e.g. proposed solutions could interface with and be integrated in existing platforms used by shippers, carriers and freight forwarders to connect with multimodal information). Proposals could also identify datasets already available or that could be developed in order to enhance the integration of IWT in multimodal supply chains;
- Define and test applications and use cases, building on the proposed solutions for advanced cooperative Smart Shipping and Smart Logistics, including integration with the physical infrastructure, in at least four demonstration pilots in actual operational environments (minimum at TRL 7). The pilots should focus on better integrating inland waterway transport in the multimodal supply chains, with a focus on cross border applications, on the accessibility and usability of node services in an automated/digital manner, and on efficient and green operations. The pilots should cover different types of goods, different routes and IWT basins (to have better EU geographical coverage), possibly along the Trans-European Transport Network corridors. To ensure a user and governance perspective approach, the pilot cases have to be led by industry stakeholders (e.g. freight forwarders, intermodal operators), in cooperation with shippers and public

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<sup>276</sup> Sustainable and Smart Mobility Strategy – putting European transport on track for the future, COM/2020/789 final

<sup>277</sup> [Directive \(EU\) 2023/2661](#)

administrations (involvement of public administrations is considered a priority). The impact of increased automation and digitalisation on all stakeholders should be considered as part of the requirements definition and throughout the design life cycle;

- Through the pilots and the application of the proposed solutions, analyse the existing relevant regional/national regulations, identify gaps and legal barriers, and propose recommendations for an EU regulatory framework on harmonised smart shipping at EU level, as well as input for the standardisation and harmonisation of the smart shipping components to the relevant standardisation bodies (e.g. CESNI, CEN, CENELEC);
- Based on the pilots' results, assess and quantify, in a comprehensive, structured and substantiated analysis, the environmental, economic and social benefits of smart shipping (including automated vessels and the link to the physical infrastructure), and the effects of increasing the use of IWT in multimodal logistics chains. Develop and propose new business models to incentivise the use of IWT;
- Foster collaboration among key stakeholders, including transport operators, logistics providers, shippers, policymakers, and technology developers, also by implementing communication activities and organising an outreach event displaying the pilots' results and the demonstrated advantages of integrating IWT in multimodal logistic chains.

**HORIZON-CL5-2025-01-D6-11: Innovative air mobility and services for sustainable and smart urban, peri-urban transport – Societal Readiness pilot**

<b>Call: Cluster 5 Call 01-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 10.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 5 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy</p>

	Community (2021-2025). <sup>278</sup>
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**Expected Outcome:** Project results are expected to contribute to all of the following outcomes:

- Enabling very low-level unmanned aviation, specifically Innovative Air Mobility (IAM) and services, for sustainable and smart urban mobility in cities, by developing and refining tools for urban planning, outreach, and system forecasting in line with the Drone Strategy 2.0<sup>279</sup>. Climate-neutral, smart, resilient, and safe IAM, accepted by local communities;
- Institutional capacities to enable IAM are built up;
- New tools and services for optimising IAM in cities and other areas, as well as workable governance arrangements for a multimodal transport network;
- Evidence-based guidelines and recommendations, co-designed with and provided to cities, on how to develop a sustainable urban air mobility eco-system (e.g. planning and development processes for local authorities, integration of IAM in Sustainable Urban Mobility Plans, etc.);
- Advanced understanding and quantification of the value of IAM, its benefits and use cases, particularly in the urban logistics sector;
- Enhanced multimodality, urban logistics planning/flow and communication between stakeholders, which can be replicated by other cities to enable IAM;
- Creation of jobs and economic growth by implementation of urban air mobility services in the long-term;
- Responsiveness to a deeper understanding of the needs and concerns of diverse social groups involved in or potentially affected by the R&I development, thereby increasing the potential for beneficial societal uptake, and building trust in results and outcomes.

**Scope:** The proposal is expected to develop the conditions and guidelines for a sustainable, smart, safe and resilient ecosystem for urban air mobility and services, focusing on the urban logistics sector, where drones could be more easily demonstrated and accepted than for passenger mobility.

Proposals will have to address all of the following points:

- Prepare a roadmap to define the needs for new or upgraded infrastructures and logistics, to facilitate innovation in IAM technologies and operations;

<sup>278</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

<sup>279</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022DC0652>

- Co-designing with and engaging city authorities, develop guidelines and tools for city authorities, to identify and integrate in their Sustainable Urban Mobility Plans the necessary infrastructure developments, including take-off and landing areas, vertiports (including operational procedures and technical assets installation), maintenance and battery charging stations, taking into consideration environmental, safety, security and privacy aspects;
- Assess the effects of IAM traffic, including electric vertical take-off and landing (eVTOL) downwash/outwash<sup>280</sup> on urban microclimate, as well as the requirements for a vertiport area, to enable safe IAM operations (incl. take-off and landing), for different VTOL aircraft and rotor configurations;
- Building on EASA's work and other studies on drone noise, assess and define the noise monitoring needs and tools that cities will have to implement, in areas where drone and IAM infrastructures and operations are planned, to ensure compliance with noise limits;
- Analyse and make a proposal on how IAM could be integrated in the existing freight transport flows in cities, to boost multimodality;
- Perform demonstration activities on IAM for cargo delivery (e.g. medical supplies), with data collection and flight monitoring between different landing/take-off areas/vertiports, while ensuring safety of operations in densely populated areas;
- Evaluate and quantify the impact and potential benefits of cargo delivery by drones and eVTOLs on city congestion, noise, pollution, as well as on current and future airspace capacity to accommodate large scale operations;
- Develop viable business models for sustainable IAM services for logistics operators, identifying key use cases where the benefits are the highest;
- In co-design with cities authorities and aligning IAM services with the needs and preferences of citizens, develop strategies and guidelines for cities to enhance public awareness and citizens' buy-in of drone integration and its benefits. Identify which benefits / incentives would be more attractive to potential customer groups motivated to adopt drone deliveries as frontrunners, to accelerate market uptake of IAM operations and services;
- Report on lessons learnt and recommendations to be shared with other cities for replication, and develop training / competence building packages for the relevant stakeholders (e.g., cities authorities involved in the design of a sustainable IAM ecosystem);

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<sup>280</sup> Downwash is the downward flow of air produced by the propulsion system of an electric vertical take-off and landing (eVTOL) aircraft, such as the thrust from rotors. Outwash refers to the outward flow of the air that results from the downwash.

- Analysis of potential rebound effects and arising questions of (energy) sufficiency with regard to extensive use and large-scale operations of IAM.

Projects must involve cities authorities (multi-level governance) and logistics operators, to ensure user needs are duly considered. Projects should build on previously funded Horizon 2020 projects such as AiRMOUR<sup>281</sup>.

The action aims to exploit synergies with the EU Mission on Climate-Neutral and Smart Cities and with the SESAR 3 Joint Undertaking, while the alignment with the activities of EASA is highly recommended.

This topic is a Societal-Readiness pilot:

- Proposals must follow the specific requirements applying to the Societal readiness pilot, as described in the introduction of the Horizon Europe Main Work Programme 2025 for Climate, Energy and Mobility. They entail the use of an interdisciplinary approach to deepening consideration and responsiveness of research and innovation activities to societal needs and concerns.
- This topic requires effective contribution of the relevant SSH expertise, including the involvement of SSH experts in the consortium, to meaningfully support Societal Readiness. Specifically, SSH expertise is expected to facilitate the socio-technological interface and enable the design of project objectives with Societal Readiness related activities.

## **Safety and resilience**

Proposals are invited against the following topic(s):

### **HORIZON-CL5-2025-01-D6-12: Safe Human-Technology Interaction (HTI) in the vehicle systems of the coming decade – Societal Readiness Pilot**

<b>Call: Cluster 5 Call 01-2025 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 8.00 million.
<i>Type of Action</i>	Innovation Actions
<i>Admissibility</i>	The conditions are described in General Annex A. The following

<sup>281</sup> <https://airmour.eu/>

<i>conditions</i>	exceptions apply:  The page limit is extended by two pages to 47.
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>282</sup></p>

**Expected Outcome:** Project results are expected to contribute to all the following expected outcomes:

- Increased understanding of the synergies between driver and driving assistance systems capabilities and implementation of tailored, “self-learning” Human-Technology Interaction (HTI) strategies in order to improve road safety;
- Avoidance of crashes related to mode confusion during the use of driver’s assist, the hand-over and take-over phase;
- Advanced standardisable assessment tools and methods for improved HTI;
- Development of training methods for new and experienced drivers with respect to the evolving technologies;
- Responsiveness to a deeper understanding of the needs and concerns of diverse social groups involved in or potentially affected by the research and innovation (R&I) development, thereby increasing the potential for beneficial societal uptake, and building trust in results and outcomes.

**Scope:** The increasing automation of road transport is bringing up new challenges especially in lower automation levels (level 3 and below) when driving control is transitioning from the driver to the vehicle or vice versa. For these levels, ensuring the right level of driver vigilance with respect to the context and the automation level is important in order to avoid dangerous situations because of cognitive distraction.

<sup>282</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

In addition, systems based on HTI are generally built on a non-stationary and non-deterministic foundation – human behaviour. Therefore, the concept of individually “adaptive” systems has to be followed and elaborated in all its particular aspects, as the consideration of “average” human behaviour is not sufficient.

This has large implications on the design of HTI systems.

Such systems should provide a reliable and seamless interface between the driver and the vehicle in normal driving conditions as well as in specific situations with a risk of generating high cognitive load, diverted attention, inattention, impaired driving, or in the case of instantaneous limitations in driving capabilities.

As drivers and their experience, as well as driving conditions, may vary a lot, HTI systems will need to address a wide variety of use cases in order to ensure a relevant Operational Design Domain (ODD)<sup>283</sup>. Therefore, in-cabin monitoring systems with adequate accuracy are key to have a clear understanding of the driver state, while considering all contextual in/out cabin data, so that the vehicle can propose a pertinent and tailored strategy to prompt the required driver action or behaviour.

Advances in in-cabin monitoring and multi-modal sensing technologies, as well as robust detection/prediction of driver cognitive status adapted to the situation awareness, will be necessary to achieve these objectives. The same applies to the need to link interior with exterior sensing capabilities.

In addition, it is necessary to enhance drivers’ understanding of the assisted and automated driving system and to avoid mode confusion. In this aspect, the implications of automation on driver training and driver’s licence requirements should be investigated. However, training methods for experienced drivers should also address the evolving technologies. This could include innovative training methods that prepare drivers for various mode transitions and safety critical scenarios like the development of virtual and mixed reality training approaches. The automation status and the limits of the system should be clearly communicated via the HTI to prevent mode confusion, enhance trust, and avoid unnecessary deactivation of the assistance or automation systems.

Special attention should be dedicated to the “hand-over” and “take-over” phases. Hand-over/take-over requests should be done considering the context (e.g. information from other vehicles or infrastructure) and the state of the driver in a way to minimise cognitive stress related to hand-over and take-over. In this context, it is important to investigate standardised requirements for the human-machine interface (including in case of system failure), including their assessment.

In this respect, the proposals should focus on developing strategies to prevent driver disengagement and minimise cognitive load during critical situations. Additionally, behavioural models and methodologies should be created to identify activities or behaviours that the vehicle’s human-machine interface (HMI) should avoid or block (such as

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<sup>283</sup> Results from the project of topic HORIZON-CL5-2023-D6-01-02 could be relevant for this issue.

entertainment systems that may distract the driver from driving tasks). These strategies must be scalable based on the sophistication of the vehicle's sensing capabilities.

Moreover, proposals should address use cases involving specific populations, such as elderly drivers with decreased sensing abilities and higher sensitivity to cognitive load, young and inexperienced drivers, and professional drivers performing multiple tasks simultaneously. For these groups, a key question is how to meet their unique needs and how to balance tailored (or personalised) vs. standardised approaches for the best results. When considering these groups, proposals are expected to consider the gender dimension.

Also, trust is mandatory for the acceptability of these systems: precision, reliability, and transparency need to be ensured. In particular, the vehicle response to a given situation as well as the level of information to be conveyed needs to be coherent and logical. Relevant research areas to achieve this objective will be the definition of multi-modal and multi-sensorial vehicle warning and response strategies for the safe management of critical phases considering user responsiveness and the severity of scenarios.

HTI systems should be upgradable both in software and in hardware with minimal disruption for the users, while ensuring that the intended effect and functionality is improved or at least maintained. A cross-fertilisation opportunity would be to investigate how other transport modes (e.g. aviation) handle upgrades/updates with minimal disruption for the user.

This topic is a Societal-Readiness pilot:

- Proposals must follow the specific requirements applying to the Societal readiness pilot, as described in the introduction of the Horizon Europe Main Work Programme 2025 for Climate, Energy and Mobility. They entail the use of an interdisciplinary approach to deepening consideration and responsiveness of research and innovation activities to societal needs and concerns.
- This topic requires effective contribution of the relevant social sciences and humanities (SSH) expertise, including the involvement of SSH experts in the consortium, to meaningfully support Societal Readiness. Specifically, SSH expertise is expected to facilitate the socio-technological interface and enable the design of project objectives with Societal Readiness related activities.

Further research and data collection is needed to ensure a better understanding of synergies between driver and assistance systems, to evaluate their performances in different contexts and user scenarios. This will enable appropriate adaptive and “self-learning” strategies to be tailored to the individual driver abilities and preferences.

In consideration of the above, proposals should address all the aforementioned aspects and issues in order to achieve the expected outcomes.

Research needs should be addressed in coherence and continuation with topics HORIZON-CL5-2021-D6-01-10, DT-ART-03-2019, HORIZON-CL5-2022-D6-01-02<sup>284</sup>, as well as HORIZON 2020-MG-2018-TwoStages (MG-2-1-2018).

**HORIZON-CL5-2026-01-D6-13: Safety of Cyclists, Pedestrians and Users of Micromobility Devices**

<b>Call: Cluster 5 Call 01-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 10.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 5-6 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>285</sup>.</p>

Expected Outcome: Project results are expected to contribute to all the following expected outcomes:

- Improved (compared to the current figures for the locations selected for the pilot testing) road safety (actual and perceived) for pedestrians, cyclists, e-cyclists and users of other micro-mobility devices, considering that the safety of these users is not only at risk from motorised vehicles, but also from their interaction with road users with higher masses or operating speeds (e.g. between e-bikes and pedestrians);

<sup>284</sup> <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-cl5-2021-d6-01-10>  
<https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-cl5-2022-d6-01-02>

<sup>285</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

- An in-depth analysis and assessment of the safety associated with the emergence of electrically assisted small vehicles such e-bikes, e-cargo bikes, e-scooters, to be referred to as micromobility modes, that may be shared or own, and are used for personal mobility (e.g. commuting) and the transportation of goods (e.g. parcel delivery);
- Increased (compared to the current figures for the locations selected for the pilot testing) use of active and micromobility modes in all age and socioeconomic groups as a result of improved safety;
- Standardisation guidelines for the authorities (cities authorities, police, and hospitals) on how to report crashes that involve micromobility modes with the objective to avoid under- and/or misreporting;
- Guidelines for the city authorities on how to incorporate micromobility modes in their Sustainable Urban Mobility Plans (SUMPs) and account for the safety and convenience of all road users;
- Development of mitigating solutions for the adverse impact on the safety of cyclists, pedestrians, and other users of the changing car fleet towards bigger and heavier vehicles;
- In depth analysis of the impact of road infrastructure (e.g. design, markings, degradation status, quality, network connectivity) on the safety and comfort of cyclists, pedestrians, and micromobility users and development of mitigation solutions;
- Assessment methodologies to evaluate the safety potential and the effectiveness of advanced safety measures.

**Scope:** The share of trips made by active modes is increasing, which is in line with the United Nations Sustainable Development Goals. This increase is linked to cities actively placing more focus on the mobility and safety needs of pedestrians, cyclists, e-cyclists and users of other micro-mobility device, which materialises in new regulations, and in new or improved infrastructure. However, pedestrians and cyclists remain heavily affected by crashes. Concurrently, the use of electrically assisted devices (such as e-bikes, e-scooters, e-cargo bikes, mobility systems used by people with disabilities, etc.) – to be referred to as micromobility modes – is increasing exponentially because these modes represent an efficient means of personal mobility, as well as a new and effective mode for the last-mile delivery of goods within the city area. Micromobility modes, shared and owned, have been adopted by commuters, tourists, the elderly, food and goods delivery companies, and come in varying sizes and operating speeds. When their use emerged, micromobility modes were associated with high hospitalisation rates, mainly for the micromobility users themselves, but also pedestrians and cyclists. While efforts have been made to regularise and standardise these vehicles, especially in the case of shared e-scooters, there is still a significant knowledge gap related to the operational safety of these vehicles in cities.

Proposals submitted under this topic should address all of the following aspects:

- Collect and use exposure data when analysing the safety of pedestrians, cyclists, and micromobility users, and identify crash contributing factors and their interactions;
- Provide an extensive analysis of the safety needs, as well as tailored safety measures for cyclists and each type of micromobility mode (e.g. shared e-scooters versus owned e-bikes), while taking into account the trip purpose (e.g. recreational ride versus delivery of goods), and the socioeconomic and demographic characteristics of the users;
- Assess the actual and perceived safety risk of pedestrians and cyclists due to the emergence of micromobility modes that operate at higher speeds and that have increased in size and weight;
- Quantify the impact of the geometric design, quality, and continuity of the cycling infrastructure on the safety of cyclists, pedestrians and micromobility users, considering their increasing demand, operating speeds, and size of vehicles;
- Assess the potential effectiveness of vehicle-to-everything (V2X) technologies in decreasing conflicts and near misses between pedestrians, cyclists and micromobility vehicles, and users and motorised vehicles;
- Identify best practices in the design of bicycles and micromobility vehicles in terms of stability and the avoidance of single crashes, contributing to the underlying development of a draft European regulatory framework on the type-approval of micromobility vehicles or self-certification based on harmonised standards;
- Identify, define and pilot test the following in at least two clearly identified real-life urban environments:
  - new geometric designs of infrastructure to ensure safe, seamless, and comfortable mobility for pedestrians, cyclists and users of micromobility modes while accounting for the increasing demand, higher operating speeds and weight and size of e-bikes, e-scooters and all types of micromobility devices;
  - smart technologies (V2X) to assess their effectiveness in preventing and decreasing conflicts between pedestrians, cyclists, micromobility modes users and motorised traffic;
  - road safety requisites, requirements, rules and/or regulations that could be put in place by local authorities in order to increase the take-up and the safety of active and micromobility modes in all age and socioeconomic groups, by 20% compared to the baseline at the start of the project;
  - development of a comprehensive, real-time information platform for cyclists that includes data on route accessibility, signage, and infrastructure conditions.

Special focus should be paid to supporting the safety of user groups with particular vulnerability including people with disabilities (physical, mental, cognitive, developmental, intellectual, sensory, etc).

Proposals are invited to explain how the work supports local/regional/national authorities' efforts to deliver on the objectives of the Vision Zero Strategy, the Strategic Action Plan on Road Safety and the EU Road Safety Policy Framework 2021-2030 as well as on the integration of road safety policies and programmes in Sustainable Urban Mobility Planning.

Proposals should plan for an active collaboration with the well-recognised initiatives in the field of road safety and urban mobility such as the European Road Safety Observatory and the CIVITAS initiative. In addition, projects awarded under this topic should demonstrate that the proposed approaches build upon the results from previous research actions<sup>286</sup> and liaise and collaborate with the projects that will be selected under topic “HORIZON-MISS-2025-06-CIT-CANCER-01: Walking and cycling: increasing their modal share to reap health benefits and emission reductions and integrating active mobility and micro-mobility devices, with smart technologies and infrastructure”.

This topic requires the effective contribution of social sciences and humanities (SSH) disciplines and the involvement of SSH experts and institutions, as well as the inclusion of relevant SSH expertise, to produce meaningful and significant effects enhancing the societal impact of the related research activities, with a focus on human-technology interaction, responsiveness of safety solutions and how this varies across different population groups, and behavioural norms.

**HORIZON-CL5-2026-01-D6-14: Predicting and avoiding road crashes based on Artificial Intelligence (AI) and big data**

<b>Call: Cluster 5 Call 01-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 10.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 5-6 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant</i>	The rules are described in General Annex G. The following exceptions

<sup>286</sup>

E.g. <https://cordis.europa.eu/project/id/861570> and <https://cordis.europa.eu/project/id/723430> projects

<i>Agreements</i>	apply: Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). <sup>287</sup> .
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Expected Outcome: Project results are expected to contribute to all the following expected outcomes:

- Knowledge of high-risk locations along the road network becoming available, before crashes actually occur, enabling road authorities to deploy appropriate countermeasures proactively;
- Predictive identification of safety-critical situations based on data from multiple sources and enabling real-time interventions to avoid crashes;
- Determination of the optimal sample size to allow for reliable real-time crash occurrence prediction;
- Enhanced monitoring of traffic flows and incorporation of traffic flow variations and patterns in real-time crash prediction, which will also lead to more effective traffic management by foreseeing unexpected or disruptive events.

Scope: One of the principles of the Safe System Approach is to turn from mainly re-active to pro-active management of road safety, i.e. not to derive needs for intervention primarily from crash investigations, but to intervene before serious crashes happen. The ubiquitous gathering of ever-growing amounts of data and their processing in the digital transport system support this idea providing valuable information on traffic situations and events. Potential data sources include amongst others: smart phones, wearables, connected vehicles, drones, road-side sensors (e.g. camera, radar), etc. Progress in computing power, in the accuracy of location services and in video analytics are further enablers in the processing and analysis of such data in order to identify safety-critical situations or conflicts based on surrogate safety metrics.

In terms of crash prediction modelling artificial intelligence has the potential to identify the underlying risk and the complex relationships between large and diverse datasets which in turn could lead to the identification of crash contributing factors and their interrelations. The identification of these risk factors may then allow predicting safety-critical situations at quantifiable risk levels and guide the proactive implementation of crash avoidance measures, as proposed amongst others by the International Transport Forum at the Organisation for

<sup>287</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

Economic Co-operation and Development (OECD). Ideally, interventions would be feasible in real-time and increase the safety of all road users.

Research should address all the following aspects:

- Development of an artificial intelligence (AI)-enabled digital twin of traffic and infrastructure. This would integrate historical, current, and forecast data, including crowdsourcing and infrastructure sensors, infrastructure topology and condition, along with environmental (e.g. local weather and visibility) and road and traffic conditions. Such a digital twin can allow monitoring and preventively optimising both safety and traffic flow, equally addressing congestion and resilience issues. Results from existing projects like OMICRON<sup>288</sup> could be considered. The proposals should also explore the possibility and usefulness of other type of data such as sociodemographic and economic data, behavioural driving data, data from security cameras, among others that could be provided by third parties (tourism, planned events, demand, etc.);
- Analyse in detail the technical challenges associated with the acquisition and use of adequate and reliable big data from multiple sensors in the road transport system, as well as the process of combining these datasets in ways that are meaningful for proactive road safety analysis;
- Develop methods and tools to predict safety-critical traffic situations at quantifiable risk levels based on real-time and historical data;
- Account for biases in the datasets and ensure that the developed AI-based models or algorithms are bias-free, so that the safety of all road users will be improved effectively in a fair, non-discriminatory way;
- Analyse in detail also the non-technical challenges associated with this approach and the inherent need to collect and share large amounts of data that can be used to identify and quantify road safety-related risk factors. Ethical, legal and economic issues should be considered and concepts be developed to overcome these challenges in terms of privacy concerns, questions of data ownership, organisational barriers etc;
- Analyse what real-time countermeasures can be taken to reduce instantaneous risk levels for all road users complementary to existing Intelligent Transport Systems (ITS) services;
- Demonstrate the feasibility of such risk predictions and targeted interventions;
- Build consensus among relevant stakeholders on possible routes for deployment in coordination with other ITS services.

Particular attention should be dedicated on establishing interoperability standards for data sharing, through the implementation of the FAIR (Findable, Accessible, Interoperable, and

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<sup>288</sup> <https://cordis.europa.eu/project/id/955269>

Reusable) data principles and leveraging on already adopted practices especially those in the relevant Common European data spaces.

Ways to leverage valuable complementary data, e.g. metadata from crash databases, should also be explored, as well as links to initiatives for European data spaces.

Research is expected to develop recommendations for updates to relevant standards and legal frameworks. International cooperation is advised, in particular with projects or partners from the US, Japan, Canada, South Korea, Singapore and Australia. Knowledge and experience from other modes where similar approaches are followed in much more controlled environments should be leveraged.

### **HORIZON-CL5-2026-01-D6-15: Icing in the context of sustainable aviation**

<b>Call: Cluster 5 Call 01-2026 (WP 2025)</b>	
<b>Specific conditions</b>	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 4.00 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Technology Readiness Level</i>	Activities are expected to achieve TRL 4-5 by the end of the project – see General Annex B. Activities may start at any TRL.
<i>Legal and financial set-up of the Grant Agreements</i>	<p>The rules are described in General Annex G. The following exceptions apply:</p> <p>Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).<sup>289</sup></p>

**Expected Outcome:** The need to perform research in the field of icing, to ensuring safety and efficiency of proposed new solutions (TRL 3-5), is justified by the increasing incidence of weather hazards caused by climate change, the new generation of low carbon dioxide (CO<sub>2</sub>)

<sup>289</sup> This [decision](#) is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under ‘Simplified costs decisions’ or through this link: [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision\\_he\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf)

aircraft with associated disruptive configurations, and the stringency of new policies and certification rules.

In the mid-term, project results are expected to contribute to the following outcomes:

- Generating scientific expertise to develop means of compliance for the certification of icing systems;
- Generating scientific knowledge to be able to develop new prototypes of ice detection and protection.

**Scope:** The field of aircraft icing is of particular importance because it relates to the safety of flight facing adverse weather conditions, which became increasingly extreme during the last decade.

The aviation industry is working to develop clean and sustainable aviation. There is the need to innovate while maintaining safety.

To enable design, validation and future certification of new technologies emerging from cleaner aviation, research should be initiated on the following three principal areas (proposals should address points 1 and 2 in full, and may consider addressing point 3 partially or in full):

1. Research to prepare for the development of means of compliance for certification of future sustainable aviation concepts including:

- Development of reliable numerical tools to be used to validate the designs against the icing environment of Appendix C, O, P and snow, including ground anti-icing fluids;
- Development of Supercooled Large Drop (SLD) Testing Capabilities such as icing wind tunnel test or ice tankers. Generation of flight-testing open datasets for validation of modelling and tunnel testing;
- Development of European Ice Crystal test Capability (for engine/air data probe);
- Development of Falling / Blowing Snow Testing Capability.

2. Research on Icing environment to assess the impact of the climate change effects on the certification icing environments<sup>290</sup>.

3. Research of new technologies for Ice detection and protection, including:

- Ice crystal and SLDs Ice Detection systems to optimise Ice crystals protection or support the detect and exit the SLD appendix O or a portion of the appendix O conditions;
- High Efficiency/Low Energy protection: cleaner aviation with more electric airplanes will drive the need for new ice protection technology: more effective and with less

<sup>290</sup> Note: the project will assess the use of specific models for the prediction of icing conditions (e.g., addressing cloud micro-physics for the formation ice crystals, super cooled water droplets), which can be coupled to climate models (e.g., General Circulation Models).

energy, active, passive and hybrid technologies (e.g., low ice-adhesion durable coatings and including new air mobility products (e.g., low speed propeller icing concerns);

- Dissimilar means for Air data (angle of attack (AOA)/Speed) measurement and insensitive to icing threat. Air speed and aircraft attitude measurements are crucial for aircraft control. Air data/navigation probes are externally mounted and exposed to adverse conditions. Dissimilar means to determine the aircraft speed and altitude would provide benefits and make the air data system even more robust and fault tolerant to environmental conditions (icing or hail);
- Enhanced aircraft performance and in particular ice protection health monitoring by improving the ice protection system monitoring coverage based on smart systems capable to monitor a large number of aircraft parameters.

This research and innovation topic is linked to several ongoing rulemaking actions of the European Union Aviation Safety Agency:

- RES.0010 Ice Crystal Detection
- RES.0017 Icing hazard linked to super cooled large droplets (SLD)
- RES.0014 Air-data enhanced fault detection and diagnosis
- RMT.0196 Update of the flight simulation training device requirements
- RMT.0118 Analysis of on-ground wing contamination effect on take-off performance degradation

A close cooperation with the European Union Aviation Safety Agency (EASA) and with notational aviation authorities during the implementation of this project should be ensured.

## **Other Actions<sup>291</sup>**

### **Grants to identified beneficiaries**

#### **1. Support to European Standardisation Organisations for the development of an improved test method for heat pumps**

Heat pumping is a key technology for the future of heating in the building sector: heat pumps will supply a sizeable share of the heat to satisfy building needs in the future. Energy efficiency is a key parameter for the uptake of heat pumps and it will also influence future energy demand for heating of buildings. Heat pump energy efficiency is regulated through ecodesign (Regulation (EU) n°813/2013) and energy labelling (Regulation (EU) n°811/2013) regulations. Harmonised standards, which are reliable, accurate, reproducible, and representative of real-life use are important for product energy efficiency regulations to be applied and enforced. In the context of the revision of the previously mentioned regulations, discussions are on-going to improve the present test method. With the present test method, the average energy efficiency (calculated in standard EN14825) is obtained by weighting the results of steady state tests obtained by setting the unit control in specific modes following manufacturer instructions (according test method defined in EN14511-3); it means that the impact of the control of the unit on the energy efficiency is not fully considered and that it cannot be ensured that the set points tested are really part of the normal functioning of the machine. In order to improve the situation, a new and dynamic methodology has been proposed, which is known as the load-based testing or compensation method. However, it was never used in a regulatory context, nor in Europe or elsewhere. This method is presently being developed within the CEN TC113/WG8 as part of standard EN14511-3.

This grant will be awarded without a call for proposals according to Article 195(e) of the Financial Regulation and Article 20(4) of the Horizon Europe Framework Programme and Rules for Participation to legal entities identified below as it follows up this previous work within the CEN TC113/WG8 in which knowledge gaps were identified. Indeed, before this new test method can be implemented by the EU in a regulatory context, it must be ensured that it is representative (shows realistic performance compared to real life), reproducible and repeatable. In that direction, a Round Robin Test is necessary to validate the method. It is also necessary to identify product subtypes whose control configuration or other characteristics would make it impossible to test with this method. This action is necessary and urgent for the EU to be able to use this improved test method in a regulatory context. If this new test method is adopted without asserting the identified knowledge gaps, problem may appear after the new test method has been adopted leading to problems in the enforcement of heat pump ecodesign and energy labelling regulations. Without this action, stakeholders are likely to remain undecided on the test method to be used with the risk of paralysing the regulatory process.

#### **Legal entities:**

<sup>291</sup> The budget amounts are subject to the availability of the appropriations provided for in the general budget of the Union for 2025.

AUSTRIAN INSTITUTE OF TECHNOLOGY GMBH, Giefinggasse 4, 1210 Vienna (Austria)

BOSCH Robert Bosch GmbH, Postfach 13 09; 73243 Wernau (Germany)

BAM, Unter den Eichen 87, 12205 Berlin (Germany)

Building Research Establishment Limited, Bucknalls Lane, Garston, Watford, Herts, WD25 9XX (UK)

CEIS, Ctra. Villaviciosa de Odón a Móstoles, 28935 Móstoles (Madrid) (Spain)

CETIAT, 25 Avenue des Arts, 69100 Villeurbanne (France)

Daikin Europe N.V., Zandvoordestraat 300, 8400 Oostende (Belgium)

DAkkS, Am Ohrberg 1, 31860 Emmerthal (Germany)

Danish Technological Institute, Gregersensvej 1, 2630 Taastrup (Denmark)

ECOS, c/o WeWork Rue du Commerce 31 1000 Brussels, Belgium

EdF R&D, Site des Renardières, Avenue des Renardières – Ecuelles, 77818 MORET SUR LOING (FRANCE)

ENGIE Lab CRIGEN, 4 Rue Joséphine Baker, 93240 Stains (France)

Eurac Research, Drususallee/Viale Druso 1, I-39100 Bozen/Bolzano (Italy)

Fraunhofer ISE, Heidenhofstrasse 2, 79110 Freiburg (Germany)

Groupe Atlantic, 13, Bd Monge - ZI - BP 71 - 69882 MEYZIEU CEDEX (France)

Heating Performance Lab GmbH, Rosberg 24, 52074 Aachen (Germany)

ILK Dresden, Bertolt-Brecht-Allee 20, 01309 Dresden (Germany)

Mitsubishi Electric - ZAC des Hautes Patures Imm Nacarat, 15 rue du 1er mai, 92000 Nanterre (France)

NIBE group, Hannabadsvägen 5, 285 32 Markaryd (Sweden)

Panasonic R&D Center Germany GmbH (PRDCG), Monzastr. 4c, 63225 Langen, Germany

Politecnico di Milano - RELAB Laboratory - Energy Department, Via la Masa 34, 20156 Milano (Italy)

RWTH Aachen University, Mathieustraße 10, 52074 Aachen (Germany)

Universität Stuttgart, IGTE - Prüfstelle HLK , Pfaffenwaldring 6A 70569 Stuttgart (Germany)

University of Gent, Universiteitstraat 4, 9000 Gent (Belgium)

Viessmann Climate Solutions SE, Viessmannstrasse 1, 35108 Allendorf/Eder (Germany)

Form of Funding: Grants not subject to calls for proposals

Type of Action: Grant to identified beneficiary according to Financial Regulation Article 195(e) - Coordination and support action

The general conditions, including admissibility conditions, eligibility conditions, award criteria, evaluation and award procedure, legal and financial set-up for grants, financial and operational capacity and exclusion, and procedure are provided in parts A to G of the General Annexes.

Indicative timetable: 1st quarter of 2025

Indicative budget: EUR 2.00 million from the 2025 budget

## **2. SET Plan Conference 2026**

Ireland will organise the annual Strategic Energy Technology Plan conference in 2026. The conference will take place in Ireland during the Irish Presidency of the Council of the European Union. The European Commission will support the organisation of the annual SET Plan conference in cooperation with the entity designated by the Irish Presidency.

This grant will be awarded without a call for proposals according to Article 195(e) of the Financial Regulation and Article 24(3)(b) of the Horizon Europe Regulation to the legal entity identified below as it is responsible for energy policy and will lead all activities on energy policies during the time of Irish Presidency of the Council of the European Union. As such, the co-organisation of SET Plan Conference falls under its competence.

Due to political sensitivity of the event, the evaluation committee will be composed fully by representatives of EU institutions. Subcontracting is not restricted to a limited part of the action.

Legal entities:

Sustainable Energy Authority of Ireland ( this may change)

Form of Funding: Grants not subject to calls for proposals

Type of Action: Grant to identified beneficiary according to Financial Regulation Article 195(e) - Coordination and support action

The general conditions, including admissibility conditions, eligibility conditions, award criteria, evaluation and award procedure, legal and financial set-up for grants, financial and operational capacity and exclusion, and procedure are provided in parts A to G of the General Annexes.

Indicative timetable: 4th quarter of 2025

Indicative budget: EUR 0.40 million from the 2025 budget

### **3. Atmospheric monitoring of emission sources of ozone-depleting substances and F-gases**

Whereas the Montreal Protocol has been successful in reducing the release of ozone depleting substances, unexpected increases in emissions, for instance linked to uses in chemical processes, have been recorded through atmospheric sampling. Parties to the Montreal Protocol have asked the scientific community to identify gaps in global coverage of atmospheric monitoring of controlled substances under the Montreal Protocol and to provide options on ways to enhance such monitoring.

The grant should support research on the optimisation of measurements of the ozone-depleting substances and F-gases, which is challenging due to the very low concentrations of the relevant substances in the atmosphere (parts per billion to parts per trillion). This should also involve research in the identification of suitable locations for measurements, including complex modelling of atmospheric circulation patterns. The grant should build on the scientific findings presented in this context to the Parties of the Montreal Protocol, including through the “Report of Scientific Assessment Panel to the 11th Meeting of the Ozone Research managers – White Paper - Identification of gaps in the global coverage of atmospheric monitoring of controlled substances and options to enhance such monitoring (2021) and outcomes of the “Workshop on Costs of atmospheric Monitoring of Gases Controlled under the Montreal Protocol (February 2024)”, and the EU-funded project operated by the UNEP Ozone Secretariat on ‘Regional quantification of emissions of substances controlled under the Montreal Protocol’.

The grant will contribute to a better understanding of potential emission sources and pathways, which are not yet fully understood, including how they are released and how they can be monitored via atmospheric sampling. It will improve the scientific basis for future decisions of the Parties to the Montreal Protocol to support potentially such monitoring. It should do so by strengthening international research cooperation in support of existing international networks for atmospheric monitoring engaged in measurements of emissions of substances controlled under the Montreal Protocol (both Ozone Depleting Substances and HFCs) and other fluorinated greenhouse gases and are looking into methodologies that can do so that are effective and cost efficient. This should include a demonstration of the deployment of such methodologies by performing in at least 3 different locations in-situ measurements for at least 2 consecutive years. The locations should cover different regions at a global scale that are identified as representing a gap in atmospheric monitoring of relevance to identify possible sources of likely emissions.

#### Legal entities:

The General Trust Fund for Financing Activities on Research and Systematic Observations Relevant to the Vienna Convention (VCTF), administered by UNEP

Form of Funding: Grants not subject to calls for proposals

**Type of Action:** Grant to identified beneficiary according to Financial Regulation Article 195(e) - Coordination and support action

The general conditions, including admissibility conditions, eligibility conditions, award criteria, evaluation and award procedure, legal and financial set-up for grants, financial and operational capacity and exclusion, and procedure are provided in parts A to G of the General Annexes.

**Indicative timetable:** 2nd quarter 2025

**Indicative budget:** EUR 4.50 million from the 2025 budget

#### **4. Strengthening international policy dialogue to address global challenges: the contribution of transport research & innovation**

In line with the “Administrative arrangement between the European Commission and the Organisation for Economic Co-operation and Development (OECD) for cooperation in the domain of science, technology and innovation policies”, the work, led by the International Transport Forum, an OECD body, in cooperation with the European Commission, aims at:

- Providing fora for EU member states, OECD member countries and all key transport stakeholders to identify transport R&I priorities of common interest, addressing technological, societal, and behavioural aspects to promote the development of sustainable and smart transport systems and infrastructure, as well as to support a socially fair transition towards such connected, integrated, accessible, environmental-friendly and safe transport and mobility for all;
- Supporting the development and uptake of innovative, sustainable and competitive transport and mobility solutions by developing concrete policy proposals relevant for the local, national or international level, with a particular focus on policies and technologies that improve energy efficiency and reductions in CO2 and local pollution from transport; economic and technological analysis of different solutions to decarbonise hard to abate transport sectors, in particular aviation, maritime and transport from heavy duty vehicles.
- Creating a favourable environment for the implementation of sustainable and inclusive transport policies, by bridging knowledge gaps, addressing skills and labour shortages, and enhancing cooperation across different sectors relevant for the development of sustainable transport systems (e.g. energy, trade and finance).

Through transport R&I diplomacy, addressing global challenges and the Sustainable Development Goals (SDGs), the work will engage, on a voluntary basis, a number of regions, countries, cities, corporations and academia and think tanks. The stakeholder fora, supported by research inputs, will further the (understanding of the) evidence-base for transport mitigation and/or adaptation measures relevant for countries’ Nationally Determined Contributions (NDCs), and will help countries meet their targets as set out in these commitments.

The work will support the development of an international coalition for effective climate change policy implementation in the transport sector, building on earlier efforts and introducing new approaches to policy making, as well as the development of a sustainable, smart and inclusive transport and mobility solutions for all, especially for hard to abate transport sectors like aviation, maritime and long haul road transport (heavy duty vehicles) where we still need to make focus on the most promising technologies.

**Legal entities:**

Organisation for Economic Co-operation and Development (OECD), 2, rue André Pascal 75016 – Paris – FRANCE

**Form of Funding:** Grants not subject to calls for proposals

**Type of Action:** Grant to identified beneficiary according to Financial Regulation Article 195(e) - Coordination and support action

The general conditions, including admissibility conditions, eligibility conditions, award criteria, evaluation and award procedure, legal and financial set-up for grants, financial and operational capacity and exclusion, and procedure are provided in parts A to G of the General Annexes.

**Indicative timetable:** Launch in the first quarter of 2025 – Expected start of contract: fourth quarter of 2025

**Indicative budget:** EUR 1.00 million from the 2025 budget

**Prizes**

**1. Renewable energy technology (RET) solutions in energy communities**

Individual energy communities encounter different challenges, such as developing a successful governance structure that is sufficiently inclusive and involves different types of actors, carrying out an effective business model and embedding activities within the structure and management of the European Commission to territorial regional and/or local plans (e.g., Just Transition Plans, Climate City Contracts, etc.).

By rewarding Energy Communities' innovative governance structure and management of a RET, the prize aims to inspire other Energy Communities to improve their operations and implementation activities and to foster innovativeness in the compliance of climate goals. In addition, this prize will also serve as inspiration and example to other types of communities to become an energy one, accelerating the pace for the ones that are already being formed/developed.

The prize will showcase the best practices from the awarded communities to other ones experiencing similar challenges and issues, portraying a (replicable) framework on how to address these issues successfully. In this way, communities will feel incentivised to apply

these practices, to improve their performance, management, etc., and so they can participate in future (similar) prize calls.

Since Energy Communities have encountered bottlenecks in terms of management, governance structure, provision of other services, etc., this prize will aid to portray the successful ones on how to develop/carry out a fruitful business model that includes and promotes different type of services, while including and improving social aspects within the community.

While showcasing governance innovativeness within the common barriers encountered to operate, the awarded communities will present a clear example that can serve as a replicable framework for other communities on how to overcome challenges and barriers, and address encountered common bottlenecks.

Furthermore, the prize is expected to contribute to the broader goals of the EU Mission on Climate-Neutral and Smart Cities by demonstrating how energy communities can play a pivotal role in achieving climate neutrality at the city level. By embedding their activities within existing strategic and systematic approaches towards climate neutrality, such as the Climate City Contracts, these communities will help cities transition to more sustainable and resilient urban environments.

The total money allocated to this prize is €1 million (EUR 1.000.000) to be awarded up to 10 winners as follows:

- 1<sup>st</sup> place: €350.000
- 2<sup>nd</sup> place: €200.000
- 3<sup>rd</sup> place: €100.000
- 4<sup>th</sup> place to tenth place: €50.000

Essential award criteria: Prizes will be awarded, after closure of the contest, to the applicants that in the opinion of the Jury demonstrates excellence within their governance structure in the following criteria:

1. Inclusivity of the governance structure: Addressing the issues of gender balance, membership diversity and solution to inequalities
2. Internal governance processes: Covering the aspects of innovative financing, mechanisms for representative governance, members participation and engagement with local authorities
3. Regional/local approach: links into territorial plans, activities related to regional policies
4. Other innovative approaches; efforts to integrate the energy community to the broader energy system, alignment with local sustainable energy and climate action plans or other relevant environmental related plans and cost saving initiatives.

Eligibility criteria: The contest will be open to all Energy Communities that fall into the definitions and concepts of the Energy Communities Repository, which identifies renewable Energy Communities and Citizen Energy Communities as defined in the [Renewable Energy Directive](#) and in the [Internal Electricity Market Directive](#). Under EU law, energy communities can take the form of any legal entity including an association, a cooperative, a partnership, a non-profit organisation or a limited liability company". In addition, only energy communities with up to 10,000 members at the time of the submission will be eligible.

Indicative timetable of contest(s):

Stages	Date and time or indicative period
Opening of the contest	3rd quarter 2025
Deadline for submission of application	3rd quarter 2026
Award of the prize	1st quarter 2027

Form of Funding: Prizes

Type of Action: Recognition Prize

Indicative budget: EUR 1.00 million from the 2027 budget

**Public procurements**

**1. Technical support for low carbon and renewables policy development and implementation**

This action aims at providing technical support for the development and implementation of policies related to low carbon and renewable energy. The main base will be the recast of the renewables directive 2018/2001 and the associated actions linked to the implementation of the revised Renewable Energy Directive (EU) 2023/2413. It will also address policy development for the implementation of the Industrial Carbon Management strategy (COM/2024/62 final)<sup>292</sup> and the hydrogen and decarbonised gas market package (Directive (EU) 2024/1788<sup>293</sup> and Regulation (EU) 2024/1789<sup>294</sup>).

This would include studies on sustainability, certification, climate impacts, industry competitiveness, consumer information, and facilitation of standardisation. Furthermore, communication activities that enable stakeholder engagement can be undertaken.

Form of Funding: Procurement

Type of Action: Public procurement

<sup>292</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2024%3A62%3AFIN&qid=1707312980822>

<sup>293</sup> [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L\\_202401788](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L_202401788)

<sup>294</sup> [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L\\_202401789](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L_202401789)

Indicative timetable: 1st quarter and 3rd quarter of 2025

Indicative budget: EUR 1.00 million from the 2025 budget

## **2. Industrial Carbon Management knowledge sharing platform**

A growing number of carbon capture, utilisation and storage (CCUS) projects are on track to become operational before 2030. The Communication on Industrial Carbon Management<sup>295</sup> emphasises the importance of aggregating these industrial-scale projects into a knowledge-sharing platform to facilitate the collection of and information on best practices between CCUS projects in the EU. This procurement is expected to establish and operate an open collaboration and knowledge sharing platform, providing data and up-to-date information about the entire CCUS sector, based on the collection of primary data from current and future large-scale demonstration projects.

The knowledge sharing platform will be open to all projects (at industrial scale, but also larger research and pilot demonstrations) that are ready to share information and cooperate without disclosing commercially sensitive information and in full compliance with single market competition rules. Depending on the type of project, the knowledge sharing platform must collect and display data on deployed technologies and storage site characteristics as well as best practices from the projects, such as project governance (including management of interphases and risks, involvement of operating organisation of facility<sup>296</sup>), barriers and success factors, needs for standards, access to funding, stakeholder management, regulatory aspects and permitting issues. It will also cover lessons learned on public engagement and on sharing best practice of dialogues between project developers, local and national authorities. The data and information must be displayed in a user-friendly way in order to be easily accessed by industry stakeholders, managing authorities, policymakers, researchers and citizens.

Form of Funding: Procurement

Type of Action: Public procurement

Indicative timetable: 2nd quarter 2025

Indicative budget: EUR 3.00 million from the 2025 budget

## **3. Alignment of national and regional priorities with co-programmed partnership in the road mobility sector of the future**

The action is aimed at supporting national and regional coordination with European co-programmed partnership in establishing connections and synergies with national and regional

<sup>295</sup> <https://ccsnorway.com/sharing-important-learning-from-building-a-ccs-facility-in-an-operating-plant/>  
[https://energy.ec.europa.eu/document/download/6b89e732fea4480b9d2e-cf64de90247e\\_en?filename=Communication\\_-\\_Industrial\\_Carbon\\_Management.pdf](https://energy.ec.europa.eu/document/download/6b89e732fea4480b9d2e-cf64de90247e_en?filename=Communication_-_Industrial_Carbon_Management.pdf)

<sup>296</sup> <https://ccsnorway.com/sharing-important-learning-from-building-a-ccs-facility-in-an-operating-plant/>  
[https://energy.ec.europa.eu/document/download/6b89e732fea4480b9d2e-cf64de90247e\\_en?filename=Communication\\_-\\_Industrial\\_Carbon\\_Management.pdf](https://energy.ec.europa.eu/document/download/6b89e732fea4480b9d2e-cf64de90247e_en?filename=Communication_-_Industrial_Carbon_Management.pdf)

research funding systems, therefore leveraging complementarities for a better integration of innovative and zero-emission road transport solutions.

Form of Funding: Procurement

Type of Action: Public procurement

Indicative timetable: 1st quarter 2025

Indicative budget: EUR 1.00 million from the 2025 budget

#### **4. Support to the development, implementation, monitoring and evaluation of climate, energy and mobility research and innovation policy activities**

The action focusses on three types of activities:

- Technical assistance, and economic and policy analysis to support various aspects of the research and innovation policy relevant in climate, energy and mobility and related sectors;
- Communication activities, such as events and publications, that could support dissemination of knowledge and information to interested organisations and individuals, as well as development of new forms of cooperation and information exchange between interested organisations and individuals;
- Provision of information on new forms of innovation in the climate, energy, and mobility sectors, as well as new forms of supporting innovation, e.g., start-up support, new business models, new financing instruments, cooperation with organisations outside the climate, energy and mobility sectors, supporting innovation investment communities and intermediaries.

Form of Funding: Procurement

Type of Action: Public procurement

Indicative timetable: as of 1st quarter 2025

Indicative budget: EUR 1.00 million from the 2025 budget

#### **5. Dissemination and information activities**

Communication activities such as meetings, conferences, out-reach communication events/papers/materials and publications should support dissemination of knowledge and information to relevant stakeholders.

Form of Funding: Procurement

Type of Action: Public procurement

Indicative timetable: as of 1st quarter in 2025

Indicative budget: EUR 0.80 million from the 2025 budget

## **6. Support to cities to enable deployment of innovative sustainable air mobility services**

The Urban Mobility Framework, adopted in December 2021, recognises Urban Air Mobility (UAM) as an emerging transport and mobility service. Several barriers remain to ensure an uptake of this new mode of transport, e.g., the preparation of cities and local authorities. This action is intended to support cities in their endeavour to introduce Innovative Aerial Services (IAS) in line with the goals of the Drone Strategy 2.0<sup>297</sup>:

- Number of cities/regions that will be served by IAM regular commercial services (Target for 2030: at least 45 in the EU and at least one per Member State)
- Number of Member States where emergency health services (medical samples, defibrillators, air ambulances) will be provided using drones (Target: services used in at least 20 Member States)

The European Commission has supported the Urban Air Mobility Initiative Cities Community (UIC2) since its creation in 2017. This action intends to:

- support the UIC2 network to provide an environment for open dialogue, consultation, and stimulation of constructive ideas on how to advance innovative technologies, achieve market deployment and integration of IAS into conventional airspaces;
- share and expand their experience, including with different stakeholders such as EASA, EUROCONTROL;
- Prepare cities for Urban Air Mobility (UAM) to become a part future urban multimodal intelligent mobility ecosystem
- Increased societal acceptance of new IAM services.

Form of Funding: Procurement

Type of Action: Public procurement

Indicative timetable: as of 3rd quarter in 2025

Indicative budget: EUR 0.50 million from the 2025 budget

## **7. Evaluation of the CIVITAS initiative on EU funded urban mobility innovation**

This action aims to assess how CIVITAS could contribute to further streamlining of urban mobility initiatives.

Since its launch in 2002, CIVITAS has addressed research and innovation in sustainable urban mobility and enabled local authorities to develop, test and roll out measures via a range

<sup>297</sup>

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022DC0652>

of projects. More than 330 local authorities have taken part in the initiative. In addition, CIVITAS has been aimed at supporting urban mobility aspects for the EU Mission on Climate-neutral and Smart Cities.

The CIVITAS National Networks (CIVINETs) have been set up to strengthen the local, regional and national capacities on sustainable urban mobility.

The 2021 Urban Mobility Framework emphasised the role of CIVITAS in bringing innovation actions to local and regional levels and asked to further strengthen the CIVITAS Initiative under Horizon Europe and its cooperation with relevant EU-funded initiatives, through the Climate-Neutral and Smart Cities mission.

The project scope will encompass:

- Desk research
- Consultation (survey, interviews) of relevant stakeholders on their understanding of value-added activities of CIVITAS and its communities.
- Analysis on the positioning of CIVITAS in relation to other urban initiatives at EU level.
- SWOT analysis. Assessment of strong and weak points
- recommendations of the ways to increase its added value as well as to build synergies with other urban initiatives.

Form of Funding: Procurement

Type of Action: Public procurement

Indicative timetable: As of 1st May 2025 for a 6 month period

Indicative budget: EUR 0.20 million from the 2025 budget

#### **Indirectly managed actions**

##### **1. Contribution to InvestEU blending operation under the Green Transition product**

The 'Fit for 55' package of measures adopted by the Commission in July 2021 sets out the policies and legislation for the EU to meet its 2030 target of 55% net greenhouse gas emissions reductions, which will create new opportunities for investment in new technologies and approaches. The final aim is decarbonising the economy in line with the objectives of the Paris Agreement, the European Green Deal and the European Union's 2050 net-zero target, and Climate Law. That is why the European Commission intends to establish an efficient framework to identify European projects deploying innovative technologies, business models and approaches to reduce the green premium – the difference between the price of a carbon-emitting technology and its clean alternative. Under existing initiatives, the Commission has already been supporting, under InnovFin and other EU programmes, a variety of

technological pathways for decarbonisation. InnovFin Energy Demonstration Projects<sup>298</sup>, in particular, has been very effective at mobilising finance for first-of-a-kind projects in the area of innovative renewable energy production, storage and smart grids. It has mobilised so far EUR 346 million of EU support for 11 operations (with total project costs of EUR 864 million).

The blending operation will target projects at TRLs 6-8 via the European Investment Bank (EIB) or other implementing partners' financial instruments, by providing loans and quasi-equity (or a combination of both), which may be blended with non-reimbursable components. The financial instrument component of operations may draw from the Innovation Fund, this Horizon Europe action, or the InvestEU budget, while the non-reimbursable component will only be funded by this Horizon Europe action – to be spent economically as a last resort option to enable project's financial closure.

The blending under the InvestEU's Green Transition product focusses on the following four areas that are underrepresented in the current portfolio of InnovFin:

- *Renewable hydrogen.* In July 2020, the Commission adopted the Hydrogen Strategy<sup>299</sup> with the aim of decarbonising its production and to expand its use to store, transport and accelerate the use of renewable energy, as well as replacing fossil fuels in specific sectors, aiming to reach 40 GW of electrolyser capacity by 2030, producing up to 10 million tonnes of renewable hydrogen. Investments in renewable hydrogen production capacity are estimated at EUR 180-470 billion in the EU until 2050. The strategy identifies as a clear priority the production of renewable hydrogen, i.e. hydrogen produced through electrolysis using renewable electricity. In this context, a top priority is to demonstrate larger size, more efficient and cost-effective electrolyzers, with capacities reaching 100 MW and above. Another priority is to further develop large scale hydrogen end-use applications, notably in industry. The path to business case feasibility (without any grant component) of the solution at potential replication sites shall also be investigated. The necessary coordination, along the value chain with the European Clean Hydrogen Alliance<sup>300</sup>, and on data and knowledge with the observatory and data base in the Clean Hydrogen Joint Undertaking, is foreseen.
- *Sustainable aviation fuels (SAF).* Though aviation accounted for only 3.7% of total CO<sub>2</sub> emissions in the EU in 2018, it accounted for 15.7% of CO<sub>2</sub> transport emissions. Reducing aviation emissions is challenging considering the long operational life of aircraft and the fact that that zero-emission aircraft configurations and powertrain options for commercial air transport are far from technological and commercial maturity. SAF can significantly reduce aviation reliance on fossil fuels, while relying on existing infrastructure and propulsion systems, but the transition will require significant investments. While several SAF production pathways are certified, their use in the fuel mix is still very low due to high production costs. The price of the most innovative and

<sup>298</sup> <https://www.eib.org/en/products/mandates-partnerships/innovfin/products/energy-demo-projects.htm>

<sup>299</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0301>

<sup>300</sup> [https://ec.europa.eu/growth/industry/policy/european-clean-hydrogen-alliance\\_en](https://ec.europa.eu/growth/industry/policy/european-clean-hydrogen-alliance_en)

sustainable types of fuels is on average estimated at up to 3 to 6 times the price of fossil aviation fuels depending on the production pathway, while their lifecycle emissions savings are 85% or more compared to fossil fuels. The path to business case feasibility (without any grant component) of the solutions at potential replication sites shall also be investigated as well as sustainability in wider scale as part of the Fit-for-55 package. The EU has therefore adopted the ReFuelEU Aviation<sup>301</sup> to boost the supply and use of sustainable aviation fuels in the EU. The action will support the development of the most innovative SAF *notably advanced biofuels and RFNBOs*<sup>302</sup> in line with the ReFuelEU Aviation and Renewable Energy Directive sustainability framework.

- *Long duration energy storage (LDES).* At any moment in time, electricity consumption and generation have to be perfectly matched. This balance is necessary not only in the short term for power grid stabilisation (for which short duration storage solutions exist), but also over the long term, to ensure supply adequacy, by compensating for fluctuations, for meteorological dark and still periods ('dunkelflaute') that can last a few weeks, and for seasonal variations between summer and winter. Long duration – weekly to seasonal - renewable grid scale energy storage needs will expand as both the electrification of demand and the share of renewable – and variable as well as distributed - energy sources in the total supply mix will grow. Sustainable long duration energy storage therefore has a key role to play in the transition towards a carbon-neutral economy. The storage system needs to be optimised for large capacity and long duration (weekly, seasonal), for minimal climate and environmental footprint over the full life cycle, for regulatory compliance and for financial viability (hence maximising round trip efficiency, minimising costs and identifying a business case for the targeted investment based on electricity storing / de-stocking price projections). The path to business case feasibility (without any grant component) of the storage solution at potential replication sites shall also be investigated. Sustainable storage solutions for renewable energy, involving an energy vector that can be used for other purposes than regenerating electricity are also eligible. The topic is open to all technologies: chemical (including hydrogen and its derivatives), electrochemical, thermal and mechanical technologies (other than pumped hydro which is mature and available commercially).
- *Direct air capture (DAC) of CO<sub>2</sub>.* European Commission scenarios reaching net-zero emission by 2050 show extensive use of carbon dioxide removal, including DAC. For example, the 1.5 tech scenario forecasts 266 Mt of CO<sub>2</sub> point capture and 200 Mt of CO<sub>2</sub> DAC. Most IPCC scenarios modelling 1.5°C paths also include a share of carbon dioxide removal (with and without DAC). DAC emerges as the most relevant source of carbon for renewable power-to-fuels/chemicals processes in such scenarios, but several challenges remain for a large-scale deployment of the technology. The future operational and financial viability (without any grant component or support scheme) of any DAC solution at potential replication sites shall also be investigated in function of the fate of

<sup>301</sup> Regulation (EU) 2023/2405 of the European Parliament and of the Council of 18 October 2023 on ensuring a level playing field for sustainable air transport (ReFuelEU Aviation))

<sup>302</sup> Renewable Fuels of Non Biological Origin (RFNBOs) as defined under RED II.

the captured CO<sub>2</sub> (i.e. underground storage or use), renewable energy source used for the capture process, and vicinity to CO<sub>2</sub> transport and storage infrastructure (in case of underground storage). The International Energy Agency estimates the current DAC cost to be within a wide range of \$100-\$1000 per captured tonne of CO<sub>2</sub>. Stakeholders claim that costs can be reduced to €50-€100 by 2030 with sufficient investments in R&I and deployment. As there is so far no specific EU initiative targeting DAC, this topic will fill an important gap.

- *Decarbonisation of Industry (steel and cement).* Rapid innovation is needed to bring to market clean technologies for those parts of the energy system where emissions are harder to address, in particular carbon intensive industries (e.g. steel, cement, chemicals, aluminium, ceramics). Carbon capture, utilisation and storage (CCUS) will play an important role in mitigating those hard-to-abate process emissions. In March 2023 the European Commission introduced the Net Zero Industry Act, which identifies CCUS as a strategic net zero technology for which scaling up of manufacturing capacity is critical to reaching the EU's climate goals. Specifically, the Act proposes to set an EU-wide goal to achieve an annual CO<sub>2</sub> injection capacity of 50 Mt by 2030, with oil and gas producers asked to contribute, in addition to setting clear timelines for permitting CCUS projects. While CCUS technologies have been demonstrated in various settings and on certain scales, it is still a challenge to scale up these technologies for widespread use, understand their performance and requirements and develop the best models for their deployment. This is due to factors such as energy efficiency, cost of capture technologies, and the technical feasibility of transporting and storing large volumes of CO<sub>2</sub>.

#### *Functioning of the blending operation*

The blending operation will be open to all applicants meeting the set eligibility criteria set in this text and InvestEU Green Transition product. As such, it is not restricted to projects proposed under pre-existing or future partnerships with the European Commission. This blending operation is particularly relevant because it seeks to bring together the public and private sector to fund pre-commercial, industry-scale demonstration projects for critical decarbonisation technologies, directly addressing the early deployment funding gap for the selected technologies and provide a structure to accelerate their commercialisation.

Projects' selection and financing procedure follows the InvestEU Regulation. In particular, the EIB or other implementing partners will check the financial viability of and perform full due diligence on each potential financing operation, while the Commission services assure their eligibility under the 'policy check' procedure. Special attention shall be paid to ensuring that the technologies developed, and Intellectual Property generated will benefit the EU interest, in particular by focussing the funds on high quality projects realised in the Union/eligible Associated Countries.

#### *Expected impact*

Unprecedented investment is needed to turn climate policy targets into reality. Attaining the 2030 target of at least 55% net emissions reduction is estimated to require EUR 350 billion of additional annual investment. Blended finance is a crucial tool to mobilise urgently needed private ‘patient capital,’ especially in domains considered too risky for the markets to function. This is the case of the technologies selected, which will benefit from investments in demonstration and scaling-up – leading to increased confidence among market participants, economies of scale in production and deployment, and significant cost reductions. The project pipeline of the InnovFin EDP and FutureMobility facility, as well as the high number of submitted proposals under the first Innovation Fund calls, indicate the richness of the EU ecosystem, which - boosted by the Fit-for-55 package - is expected to thrive in the coming years. The initiative will accelerate the reduction of the green premium in key areas, allow for wider, faster up-take and contribute to the creation of jobs in the EU in green industries manufacturing these solutions.

**Legal entities:**

European Investment Bank (EIB), 98-100, boulevard Konrad Adenauer, L-2950 Luxembourg, Luxembourg

**Form of Funding:** Indirectly managed actions

**Type of Action:** Indirectly managed action

**Indicative timetable:** as of 1st quarter 2025

**Indicative budget:** EUR 50.00 million from the 2025 budget

**2. Voluntary contribution to the IEA's Clean Energy Transitions Programme (CETP)**

The IEA's Clean Energy Transitions Programme (CETP) turns targets into action, working to accelerate progress towards the goal of global net zero emissions through secure and people-centred clean energy transitions, with a focus on major emerging and developing economies. Drawing on the IEA's recognised expertise, this programme assists the target countries in overcoming the energy technology and policy challenges of moving towards the implementation of the Paris Climate Agreement. In 2022, at the IEA's Ministerial Meeting, 15 IEA member countries and the European Commission expressed their support to the CETP, with the goal of accelerating the global transition to net zero emissions.

The CETP delivers collaborative action across three areas: 1. Accelerating national transitions (supporting emerging and developing economies to develop and implement timely strategies for achieving national clean energy transition goals); 2. Strengthening multilateral coordination (facilitating international collaboration to scale up innovation and deployment of clean energy sources and technologies); 3. Informing global energy dialogue (developing greater international understanding of barriers and environmentally sustainable solutions for the development and deployment of clean energy technologies).

The CETP has been contributing to the international objectives of the European Green Deal and received EU funding since 2020.

This Contribution Agreement will be awarded without a call for proposals according to Article 195 (e) of the Financial Regulation and Article 20(4) of the Horizon Europe Framework Programme and Rules for Participation to the legal entity identified below as it contributes directly and significantly to the external dimension of the EU Green Deal and the Paris Climate Agreement and can leverage IEA's unique clean energy expertise and recognition in major emerging economies.

**Legal entities:**

Organisation of Economic Cooperation and Development (International Energy Agency), OECD, rue André-Pascal 2, PARIS CEDEX 16 75775

**Form of Funding:** Grants not subject to calls for proposals

**Type of Action:** Grant to identified beneficiary according to Financial Regulation Article 195(e) - Coordination and support action

The general conditions, including admissibility conditions, eligibility conditions, award criteria, evaluation and award procedure, legal and financial set-up for grants, financial and operational capacity and exclusion, and procedure are provided in parts A to G of the General Annexes.

**Indicative timetable:** 4th quarter 2025

**Indicative budget:** EUR 3.00 million from the 2025 budget

**Subscriptions**

**1. Contribution to Technology Collaboration Programmes (TCPs) of the International Energy Agency (IEA)**

The Commission represents the European Union in the Technology Collaboration Programmes (TCPs) concluded under the framework of the International Energy Agency where it participates in activities in certain areas of energy research. The annual financial contributions will be paid to the entities responsible for managing the following TCPs:

- Geothermal Energy Research and Technology;
- Bioenergy;
- Ocean Energy Systems (OES TCP);
- International Smart Grids Action Network (ISGAN TCP)
- Greenhouse Gas Research & Development;

- Concentrating Solar Power, Thermal, and Chemical Energy Systems (SolarPACES TCP)
- Photovoltaic Power Systems (PVPS TCP);
- Solar Heating and Cooling (SHC TCP);
- Hydrogen;
- Hydropower
- Wind Energy Systems;
- Energy Efficient End-Use Equipment (4E TCP);
- Equality in Energy Transitions;
- Hybrid and Electric Vehicle Technology Collaboration Programme (HEV TCP).

Type of Action: Subscription action

Indicative timetable: 1st quarter 2025

Indicative budget: EUR 0.50 million from the 2025 budget

## **2. Contribution to the International Renewable Energy Agency (IRENA)**

The European Union is a member of IRENA. According to the organisation's Statute and Financial Regulation this implies the obligation to pay an annual contribution to its budget covering the participation of the EU in IRENA's activities. In addition to its annual contribution, the EU supports Ukraine's membership in IRENA by a voluntary contribution, covering Ukraine's annual contributions on hold since the Russian invasion. IRENA's main objective is to disseminate best practices in the field of renewables as the principal platform for international cooperation in the field, a centre of excellence on renewable energy and a repository of policy, technology, resource, and financial knowledge. This includes:

- The promotion of the widespread and increased adoption and the sustainable use of all forms of renewable energy globally, including in the EU, in particular to bring down costs and also to increase market experience, in order to contribute to economic growth and social cohesion as well as access to and security of energy supply;
- Support activities for countries in their transition to a renewable energy future;
- Reducing of barriers for renewable energy, stimulating best practice and raising awareness.

Type of Action: Subscription action

Indicative timetable: 1st quarter 2025

Indicative budget: EUR 0.60 million from the 2025 budget

**3. Voluntary contribution 2025 to the Secretariat of the Clean Energy Ministerial (CEM) for Phase IV (July 2025 – June 2028), as well as to participation in its workstreams**

The Clean Energy Ministerial (CEM) is a high-level global forum to promote policies and programmes that advance clean energy technology, to share lessons learned and best practices, and to encourage the transition to a global clean energy economy. Initiatives are based on areas of common interest among participating governments and other stakeholders. It serves as a platform where its members help shape the global clean energy agenda and advance the deployment of specific clean energy technologies and solutions; a bottom-up, government-led community for exchanging knowledge and insights; an implementation vehicle that helps its members to achieve specific domestic clean energy objectives.

The Commission has been active in the CEM since its inception in 2010, with the European Union officially becoming member on 6 June 2016, following the formal endorsement of the CEM Framework by EU Energy Ministers.

The CEM Framework established a multilateral CEM Secretariat to facilitate the long-term engagement of all CEM Members in the work. The secretariat is hosted at the International Energy Agency (IEA) under an "Administrative Arrangement" between the IEA and the CEM Members. In order to provide "adequate and predictable financial resources" for the CEM Secretariat, CEM Members provide voluntary contributions on an annual or multi-annual basis.

The Commission supports the extension of the CEM mandate to Phase IV (from July 2025 to June 2028) and intends to provide voluntary contribution for its Secretariat as well as for the specific workstreams it co-leads: the Super-efficient Equipment and Appliance Deployment (SEAD) initiative (50.000 EUR/year), the Hydrogen initiative (20.000 EUR/year) and the Supercharging Battery Storage (SBS) initiative (50.000 EUR/year).

Type of Action: Subscription action

Indicative timetable: as of 1st quarter 2025

Indicative budget: EUR 0.72 million from the 2025 budget

**4. Contribution to the International Energy Agency (IEA) – Energy Efficiency Hub (EE HUB)**

The purpose of the International Partnership for Energy Efficiency Cooperation (IPEEC) is to strengthen international cooperation on energy efficiency. The action carried out under the auspices of the partnership should result in more effective energy policy and programme output, in best practices being more widely known, disseminated, and applied and in economies of scale. The aim of the partnership is to offer a topic-driven, structured dialogue and an operational network for enhanced cooperation and exchanges on energy efficiency between countries and international organisations by:

- exchanging information and experience on development of regulatory measures, policies and programmes;
- developing benchmarks and sharing information on goods and services, along with measurement methods regarding energy performance and energy savings;
- strengthening information, education and training for energy consumers;
- building stakeholder capacity by improving contacts between national, regional, and local authorities and other relevant partners and stakeholders, exchanging views, and sharing knowledge and experience.

Type of Action: Subscription action

Indicative timetable: 1st quarter 2025

Indicative budget: EUR 0.08 million from the 2025 budget

## **5. Subscription of the EU to the Intergovernmental Panel on Climate Change (IPCC)**

The European Union is an observer of the Intergovernmental Panel on Climate Change (IPCC), the most authoritative source of knowledge about climate change. The IPCC policy on observers recognises the special status of the European Union by conferring to it rights similar to those of member governments (the right to speak, to introduce proposals and to participate in government reviews), except for the right to vote or be elected. The IPCC puts no financial obligations on members and observers and funded solely through voluntary contributions and grants. The EU has been a significant contributor to the IPCC including, most recently, though a grant under topic H2020-IBA-SC5-IPCC-2019 aimed to facilitate the preparation of the IPCC's its Sixth Assessment Report (AR6), expiring in 2024, followed by a subscription action for 2024. Given IPCC's importance in promoting science-based approaches in climate action, it would be appropriate to continue supporting the IPCC Panel through a subscription at the current rate as a token of EU's status and commitment to evidence-based policies.

Type of Action: Subscription action

Indicative timetable: 3rd quarter 2025

Indicative budget: EUR 0.63 million from the 2025 budget

## **Scientific and technical services by the Joint Research Centre**

### **1. Support for the transition towards CCAM**

This action aims at providing scientific and technical support from the JRC to EU policies related to the transition towards Connected, Cooperative and Automated Mobility (CCAM) in road transportation. Activities will be coordinated with the European players in this domain such as the CCAM Partnerships and other relevant stakeholders.

Type of Action: Provision of technical/scientific services by the Joint Research Centre

Indicative timetable: 3rd quarter 2025

Indicative budget: EUR 0.50 million from the 2025 budget

## **2. Administrative Agreement with the JRC on EU & International Greenhouse Gas Emissions Modelling**

This action aims at conducting research and providing analytical support to the implementation of the climate policies within the European Green Deal and on future EU policy initiatives for the post-2030 policy framework in view of reaching the EU's climate neutrality objective by 2050.

The action will build on a set of modelling tools developed and maintained by JRC (including but not necessarily limited to POLES-JRC, POTEnCIA and JRC-GEM-E3), which ensures a full coverage of global GHG emissions' monitoring, allows to identify the role of carbon removals, and helps in understanding and analysing the socio-economic aspects of the clean transition. The action will cover the further development and deployment of such tools, where relevant, to address new policy research questions.

Furthermore, the action aims to support research and related outreach with counterparts in third countries (particularly in major emitting economies outside the EU and least developed countries) with a view to promote the use of economic analysis tools in policy preparation, build capacity and strengthen the interface between economic modelling research – relevant for climate policy – and policy making in these countries.

Type of Action: Provision of technical/scientific services by the Joint Research Centre

Indicative timetable: 3rd Quarter 2025

Indicative budget: EUR 2.25 million from the 2025 budget

## **3. Technical and scientific assistance for the Energy Efficiency Directive (EED), the Energy Performance of Buildings Directive (EPBD), the Ecodesign Directive and the Energy Labelling Regulation**

JRC should provide technical and scientific assistance to enable the European Commission to meet its obligations on the EU energy efficiency legislative framework, most notably the Energy Efficiency Directive (EED), the Energy Performance of Buildings Directive (EPBD), the Ecodesign Directive and the Energy Labelling Regulation.

The main components of the work to be carried out are divided into four work packages. The work packages and the necessary tasks and deliverables are:

- WP 1 - Support to the implementation of the Governance Regulation with regards to Energy Efficiency related dimension including buildings;

- WP 2 - Technical and scientific support to the review of EU Energy Efficiency legislation including energy performance of buildings and products;
- WP 3 - Support to the implementation of EU Energy Efficiency legislation currently in force including energy performance of buildings and products;
- WP 4 - Collecting, processing, and analysing relevant data to properly assess complex technical, environmental, economic, and social aspects of energy efficiency including energy performance of buildings and products.

Type of Action: Provision of technical/scientific services by the Joint Research Centre

Indicative timetable: 1st quarter of 2025

Indicative budget: EUR 1.00 million from the 2025 budget

#### **4. Advancing of the TEN-T alternative fuels infrastructure analyses to support research and policy**

Detailed, timely and reliable information on the progression from research to deployment is essential for further research, evidence-based policy and decision making. In particular, with the adoption of the ‘Fit for 55’ package, including the Alternative Fuels Infrastructure Regulation (AFIR), the revised TEN-T regulation and other relevant initiatives, information on alternative fuels infrastructure deployment and identified gaps in the transport network is crucial to monitor and to support the uptake of innovative solutions for sustainable transport. Enhanced mapping and data visualisation of the alternative fuels infrastructure network can also facilitate investments in research and innovation by private stakeholders. Valuable information is becoming increasingly available, for instance through the European Alternative Fuels Observatory (EAFO) and the analyses performed in TENtec. However, additional data and analyses are needed to develop and enhance comprehensive algorithms that consider routing, and perform an in-depth, comprehensive assessment of alternative fuels network coverage on the TEN-T network. The development and integration of new thematic data layers into TENtec will also foster new analyses and research into the opportunities and effects of EU policies on alternative fuels.

Type of Action: Subscription action

Indicative timetable: 2nd quarter of 2025

Indicative budget: EUR 0.30 million from the 2025 budget

#### **Expert contract actions**

##### **1. External expertise to advise on EU research and innovation policy**

This action will support the provision of independent expertise in support of the design, implementation, and valorisation of EU research policy. Individual experts will work in the following domains:

- Analysis, design, assessment and implementation of strategic climate, energy and mobility research and technology options and actions;
- Future climate, energy, and mobility -related research actions and programmes, contribution to their impact assessment;
- International cooperation in the field of climate, energy and mobility research and innovation;
- Analysis and valorisation of EU climate, energy and mobility research results in view of contributing to the elaboration of policy reports (such as projects for policy, project cluster reports, etc.);
- Preparation of actions for Horizon Europe missions.

The tasks of individual experts would include:

- Analysis of the contribution of the funded research to the EU policy objectives spanning across all climate, energy and mobility modes and systems;
- Analysis of the state-of-the-art at international level; investigation of deployment options for the developed knowledge;
- Participation in international symposia, including the drafting of White Papers and reports on the symposia's conclusions;
- Advise the Commission on promising technologies covered by European and nationally funded projects and on ways to stimulate synergies;
- Assist the Commission in the evaluation of calls for expression of interest.

In addition to individual experts, this action could provide for Commission expert groups.

Form of Funding: Other budget implementation instruments

Type of Action: Expert contract action

Indicative timetable: As of 1st quarter 2025

Indicative budget: EUR 0.50 million from the 2025 budget

## **2. Experts for the monitoring of actions**

This action will support the use of appointed independent experts for the monitoring of running actions (grant agreement, grant decision, public procurement actions, financial instruments) funded under Horizon Europe and previous Framework Programmes for Research and Innovation, and where appropriate include ethics checks, as well as compliance checks regarding the Gender Equality Plan eligibility criterion.

Form of Funding: Other budget implementation instruments

Type of Action: Expert contract action

Indicative timetable: 1st quarter 2026

Indicative budget: EUR 0.80 million from the 2026 budget

### **Service level agreements**

#### **1. Contribution to DIGIT for hosting website fees for BRIDGE and ETIP SNET web presence**

The ETIP Smart Networks for Energy Transition (SNET) is one of the ETIPs set up by European Commission as part of the SET-Plan and is guiding Research, Development & Innovation (RD&I) to support Europe's energy transition.

BRIDGE is a cooperation group involving more than 150 EU-funded projects in the field of smart grid, energy storage, islands, and digitalisation.

The two initiatives are coordinated by the European Commission and their websites are hosted on the EUROPA server as the information generated belongs to the Commission. These websites must follow standards on their design to promote a common visual experience to all Commission related websites and initiatives. Costs engaged to host related services (e.g., secure environment, tools to develop and maintain websites) reach the amount of €30.000 per year per website.

Type of Action: Service Level Agreement

Indicative timetable: 1st quarter 2025 and 1st quarter 2026

Indicative budget: EUR 0.12 million from the 2025 budget

**Budget<sup>303</sup>**

	Budget line(s)	2025 Budget (EUR million)	2026 Budget (EUR million)	2027 Budget (EUR million)
<b>Calls</b>				
HORIZON-CL5-2025-01		180.60		
	<i>from 01.020250</i>	<i>180.60</i>		
HORIZON-CL5-2025-02		281.00		
	<i>from 01.020250</i>	<i>281.00</i>		
HORIZON-CL5-2025-03		157.50		
	<i>from 01.020250</i>	<i>157.50</i>		
HORIZON-CL5-2026-01		172.00		
	<i>from 01.020250</i>	<i>172.00</i>		
HORIZON-CL5-2026-02		312.00		
	<i>from 01.020250</i>	<i>312.00</i>		
Contribution from this part to call HORIZON-MISS-2025-07 under Part 12 of the work programme		2.21		
	<i>from 01.020250</i>	<i>2.21</i>		
Contribution from this part to call HORIZON-MISS-2025-01 under Part 12 of the work programme		69.72		
	<i>from 01.020250</i>	<i>69.72</i>		
Contribution from this part to call		5.00		

<sup>303</sup>

The budget figures given in this table are rounded to two decimal places.

The budget amounts are subject to the availability of the appropriations provided for in the general budget of the Union for 2025.

HORIZON-CL4-2025-02 under Part 7 of the work programme	<i>from</i> 01.020250	5.00		
Contribution from this part to call HORIZON-MISS-2025-06 under Part 12 of the work programme		6.28		
	<i>from</i> 01.020250	6.28		
Contribution from this part to call HORIZON-MISS-2025-04 under Part 12 of the work programme		37.69		
	<i>from</i> 01.020250	37.69		
Contribution from this part to call HORIZON-MISS-2025-03 under Part 12 of the work programme		72.55		
	<i>from</i> 01.020250	72.55		
<b>Other actions</b>				
Grant to identified beneficiary according to Financial Regulation Article 195(e)		10.90		
	<i>from</i> 01.020250	10.90		
Prize				1.00
	<i>from</i> 01.020250			1.00
Public procurement		7.50		
	<i>from</i> 01.020250	7.50		
Indirectly managed action		50.00		
	<i>from</i> 01.020250	50.00		
Subscription action		2.83		
	<i>from</i> 01.020250	2.83		
Provision of technical/scientific services by the Joint Research Centre		3.75		
	<i>from</i> 01.020250	3.75		
Expert contract action		0.50	0.80	

	<i>from</i> 01.020250	0.50	0.80	
Service Level Agreement		0.12		
	<i>from</i> 01.020250	0.12		
Contribution from this part to Public procurement under Part 12 of the work programme		9.14	0.92	
	<i>from</i> 01.020250	9.14	0.92	
Contribution from this part to Indirectly managed action under Part 12 of the work programme		13.12		
	<i>from</i> 01.020250	13.12		
Contribution from this part to Specific grant agreement under Part 12 of the work programme		19.25		
	<i>from</i> 01.020250	19.25		
Contribution from this part to Provision of technical/scientific services by the Joint Research Centre under Part 12 of the work programme		0.31		
	<i>from</i> 01.020250	0.31		
Contribution from this part to Expert contract action under Part 12 of the work programme		0.60		
	<i>from</i> 01.020250	0.60		
<b>Estimated total budget</b>		1414.56	1.72	1.00