Horizon Europe

Work Programme 2026-2027

Climate, Energy and Mobility

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Introduction

The overarching driver for this cluster is the need to accelerate the twin green and digital transitions and associated transformation of our economy, industry and society with a view to achieving climate neutrality and resilience in Europe by 2050, and to increase the competitiveness of the European economies. 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, security 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[1]. 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[2] will support the European Commission's Clean Industrial Deal[3], the Competitiveness Compass[4] and the Net-Zero Industry Act[5], 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 strengthening European societies and their social and economic model.

Cluster 5 supports the EU's strategic objectives through activities included in this work programme and through the support of Institutional European Partnerships[6] 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[7]. Cluster 5 contributes also to the Strategic Energy Technology Plan (SET Plan) objectives and its domain-specific implementation plans.

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1 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.

2 Cluster 5 also contributes financially to selected activities placed in other work programme annexes, notably to the topic "R&I in Support of the Clean Industrial Deal: Clean Technologies for Climate Action" which is part of the Clean Industrial Deal joint call included in the XXX annex of work programme 2026-2027.

3 https://commission.europa.eu/topics/eu-competitiveness/clean-industrial-deal_en

4 https://commission.europa.eu/topics/eu-competitiveness/competitiveness-compass_en

5 https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/green-deal-industrial-plan/net-zero-industry-act_en

6 Clean Hydrogen, Transforming Europe's rail system, Integrated Air Traffic Management, Clean Aviation

7 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

Activities in this work programme will contribute to all **Key Strategic Orientations (KSOs)** of the Strategic Plan[8]:

- **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.

- **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 reinforce 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 capacity in developing and deploying critical technologies are overarching drivers 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.

Expected Impact (Strategic Plan 2025-2027)	**Destination (Cluster 5 work programme 2025)**
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

[8] https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/strategic-plan_en

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 cross-cutting technologies and solutions for climate, energy and mobility applications. Destination 3 and 4 focus 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.

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 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)[9], European Social Fund Plus (ESF+)[10], Just Transition Fund[11], LIFE[12], Innovation Fund[13], InvestEU[14], European Defence Fund (EDF)[15]), 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 Communities (KICs)** of the European Institute of Innovation and Technology (EIT)[16]. The

9 https://ec.europa.eu/regional_policy/en/funding/erdf/
10 https://ec.europa.eu/esf/main.jsp?catId=62&langId=en
11 https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/just-transition-mechanism/just-transition-funding-sources_en
12 https://ec.europa.eu/environment/archives/life/index.htm
13 https://ec.europa.eu/inea/en/innovation-fund
14 https://ec.europa.eu/commission/priorities/jobs-growth-and-investment/investment-plan-europe-juncker-plan/whats-next-investeu-programme-2021-2027_en
15 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.
16 https://eit.europa.eu/our-communities/eit-innovation-communities

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, by 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 that are complementary to the activities of the EIT KICs. Collaboration with other innovation communities that can support the project implementation and impact is also encouraged. Any such cooperation should be based on adequate intellectual property management strategies.

The integration of **Social Sciences and Humanities (SSH)** as well as the involvement of stakeholders (including citizens and civil society) in projects is pivotal to understanding and facilitating societal transformation towards more sustainability and resilience. This encompasses shifts in governance and institutions, socio-political relations, socio-cultural factors and knowledge systems. Such issues are embedded in relevant topics across the six destinations of the Cluster 5 Work Programme. In addition, this work programme continues the pilot on the **Societal Readiness** approach launched in work programme 2025. This approach is based on Responsible Research and Innovation processes, with a strong focus on interdisciplinarity and knowledge integration. The integration of a Societal Readiness approach into R&I processes aims to address different societal needs and concerns, 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 to achieving key EU priorities. With regard to Cluster 5, the Commission pushes the acceleration of clean energy innovation through the **Mission Innovation**[17] Initiative, which was launched at COP21 and currently comprises 23 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. Furthermore, targeted cooperation with **India** through a joint topic on battery recycling is included. 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 in this Work Programme are encouraged to consider, where relevant, the services offered by the EU-funded European Research Infrastructures, notably those prioritised

[17] http://mission-innovation.net/our-work/innovation-challenges/

by the European Strategy Forum on Research Infrastructures (ESFRI)[18], European Research Infrastructure Consortia (ERICs)[19] and the European Open Science Cloud.

For topics in this cluster, consortia should 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[20]:

- 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);
- 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/);
- Innovation in the Built Environment Research Group (iBUILT+) (https://joint-research-centre.ec.europa.eu/scientific-activities-z/iresist-home_en).

In addition, consortia should consider their voluntary contribution in terms of knowledge to relevant **European Commission (Eurostat) statistical methodologies** for capitalising the knowledge developed in their projects and become more policy relevant.

Particular efforts should be made to ensure that the data and data management tools produced by projects funded under this work programme are **FAIR** (Findable, Accessible, Interoperable

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

[19] The ERIC Landscape https://www.eric-forum.eu/the-eric-landscape/

[20] Contributions with relevant data, indicators, or knowledge to these JRC-managed platforms do not require having JRC as a partner (associated partner/beneficiary requesting zero funding) in a project, unless it is explicitly mentioned in a specific topic of this Cluster.

and Re-usable) and that, where relevant, the services of the European Open Science Cloud (EOSC) are used.

As regards the technology progress monitoring against the European Green Deal Objectives and the ambitions of the Clean Industrial Deal, 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 [21]. The reporting should consist of filling in the template questionnaire(s) relevant to the project content (and the technology development and TRL).

Instructions 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[22]. In Cluster 5 work programme 2025, a Societal Readiness approach is being proposed to deepen relationships between R&I and society. A number of topics[23] within the Work Programme 2025 have been selected as a 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 pilot in Societal Readiness will be closely assessed and analysed through a dedicated Coordination and Support Action *HORIZON-CL5-2026-01-D2-09: Monitoring 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 and interact effectively and in 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 follow those instructions.

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

- Resources should be explicitly allocated to cover project activities associated with advancing Societal Readiness. Societal Readiness considerations should be integrated transversally in the proposal, either as a set of tasks across work packages associated with the R&I work, or in the form of a transversal work package.

21 https://www.clean-hydrogen.europa.eu/knowledge-management/annual-data-collection_en
22 https://eur-lex.europa.eu/eli/reg/2021/695/oj: See preamble point 51
23 HORIZON-CL5-2025-03-D1-06; HORIZON-CL5-2025-02-D3-04; HORIZON-CL5-2026-02-D4-02; HORIZON-CL5-2025-04-D5-01; HORIZON-CL5-2025-04-D6-01; HORIZON-CL5-2025-04-D6-02; HORIZON-CL5-2025-04-D6-11; HORIZON-CL5-2025-04-D6-12

- Consortia should bring sufficient expertise to support Societal Readiness activities via the inclusion of partners with appropriate expertise in SSH disciplines[24]. These partners will facilitate the socio-technical interface and enable the design of project objectives, work packages and tasks compatible with Societal Readiness related activities.

- All partners in the consortia should be associated to the Societal Readiness tasks, where relevant, building on interdisciplinarity efforts to facilitate knowledge integration.

- Proposals should clearly address, under section *1.2 Methodology*, how the project will integrate Societal Readiness throughout the proposed work, by demonstrating how they take up 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-CL5-2026-01-D2-09* (e.g., participation in physical format to annual workshops, availability to reply to interviews, punctual exchanges with other Societal Readiness pilot projects, provide access to Societal Readiness related information). Travel costs to attend physical workshops will be covered by topic *HORIZON-CL5-2026-01-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 the 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 interdisciplinary or intersectoral activities, 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 increase by two additional pages. The proposed work is expected to reflect an integration of Societal Readiness consideration into the overall project design.

[24] 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.

Responsible Research and Innovation (RRI) guiding questions:

The following guiding questions[25] 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 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[26]). 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

[25] 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., & Mejlgaard, 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

[26] https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/programme-guide_horizon_en.pdf

points is issued, which reflects the overall score of the proposal for the "Excellence" evaluation criterion.

Definitions related to Societal Readiness considerations in Horizon Europe proposals and projects

1. Societal Readiness

Societal Readiness[27] is an indicator of R&I results, expressing they have accounted for different societal needs and concerns, thereby increasing its potential for societal uptake and transition towards societal adaptation.

R&I results with well-developed Societal Readiness will:

- better align innovation trajectories with societally desired and needed goals;
- build inclusive and multi-stakeholder coalitions for change;
- understand diverse apprehensions and interests; and
- adapt to overcome undesired aspects of the proposed innovation.

Working toward Societal Readiness means to better understand that R&I should be:

- driven by the needs, values, and expectations of diverse social groups (e.g., gender, age, socio-economic situation, geography, vulnerable persons[28], etc.);
- inclusive and transparent in processes and outcomes;
- active in identifying, mitigating, and avoiding negative/providing positive social, environmental, and economic externalities.

Societal Readiness will contribute to more impactful R&I by widening the focus of researchers and innovators from the very beginning or in the course of an innovation effort to address broader, long-term societal concerns. It will therefore support achieving European Commission policy objectives and help achieving the UN's Sustainable Development Goals[29].

2. Responsible Research & Innovation (RRI)

To deliver R&I results with well-developed Societal Readiness, the four dimensions of Responsible Research & Innovation offer a helpful starting point:

Responsible Research and Innovation (RRI), as a concept introduced in R&I policy and previous European Commission framework programmes, primarily focuses on *processes* of

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27 Definition informed by NewHoRRizon project's Societal Readiness Thinking Tool (for Applicants) and Geels "Socio-technical transitions to sustainability" https://newhorrizon.eu/thinking-tool/

28 https://home-affairs.ec.europa.eu/networks/european-migration-network-emn/emn-asylum-and-migration-glossary/glossary/vulnerable-person_en

29 In particular SDG5 (Gender equality); SDG10 (Reduced inequalities); SDG16 (Peace, justice and strong institutions)

R&I. In the context of care for the future, RRI offers a set of procedural interventions in policy makers' and researchers' activities by supporting co-creation with societal actors in different ways. Specifically, RRI asks for four dimensions to be practiced in research[30,31]:

- **Reflection** on the goals, values, and activities of R&I: Reflection is about reasoning on the underlying motivations, assumptions, and commitments driving the R&I work.
- **Inclusion** of broader, diverse groups of stakeholders and participants: Inclusion is closely related to public engagement and stakeholder involvement. It is about involving relevant societal actors in R&I activities from an early stage, and ensuring continuous, open dialogue about desirable outcomes throughout the project.
- **Anticipation** of possible consequences, knock-on effects, unintended consequences of R&I: Anticipation is about carefully examining both the intended and possible unintended consequences arising from R&I activities, including environmental, health-related, economic, and social impacts.
- **Responsiveness** to recommendations and changes to improve R&I processes in the service of improved public impact: Responsiveness is about aligning R&I activities with the new perspectives, insights, awareness, and values that emerge in the process of being more anticipatory, reflexive, and inclusive in R&I processes. It presupposes a will to learn from practical experience and a capacity to translate this learning into responsible R&I solutions.

These four dimensions inform the guiding questions provided in support of developing proposals and implementing projects aiming to reach a well-developed Societal Readiness.

3. Integration of Social Sciences and Humanities (SSH)[32]

To achieve a well-developed Societal Readiness of R&I results, social and cultural perspectives need to be covered. This may be done by researchers from Social Science and Humanities (SSH) disciplines[33] , as those disciplines have developed a wide range of theories and methods to better understand human behaviour and social organisation.

30 Owen, R., Macnaghten, P., & Stilgoe, J. (2012). Responsible Research and Innovation: From science in society to science for society, with society. Science and Public Policy, 39(6), 751–760. https://doi.org/10.1093/scipol/scs093

31 Burget, M., Bardone E., Pedaste M., (2017). Definitions and Conceptual Dimensions of Responsible Research and Innovation: A Literature Review. Science and Engineering Ethics, 23, 1-19 https://doi.org/10.1007/s11948-016-9782-1

32 SSH disciplines are relevant to R&I in Cluster 5, since they help to investigate the societal aspects of climate, energy and mobility challenges and opportunities. They have been integrated and mainstreamed in Horizon Europe Cluster 5 topics since the start of the Horizon 2020 Framework Programme https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/programme-guide_horizon_en.pdf

33 See above resource, pages 21 – 22, for a list adapted from UNESCO International Standard Classification of Education (ISCED 2011).

Social Sciences and Humanities (SSH) study aspects of human society:[34]

- SSH encompass a wide range of disciplines such as sociology and economics, psychology and political science, history and cultural sciences, law, and ethics. Contributions from these research fields are needed to generate new knowledge, support evidence-based policymaking, develop key competences and produce interdisciplinary solutions to both societal and technological issues[35].

- Social science is the study of people: as individuals, communities, and societies; their behaviours and interactions with each other and with their built, technological, and natural environments. Social science seeks to understand the evolving human systems across our increasingly complex world and how our planet can be more sustainably managed. […] Social science includes many different areas of study, such as how people organise and govern themselves, and broker power and international relations; how wealth is generated, economies develop, and economic futures are modelled; how business works and what a sustainable future means; the ways in which populations are changing, and issues of unemployment, deprivation and inequality; and how these social, cultural and economic dynamics vary in different places, with different outcomes[36].

- Humanities (e.g., disciplines like History, Arts, Philosophy, Theology) are concerned with fundamental, and sometimes unspoken, principles that underpin human cultures, how people reason, how societies are ordered and governed, and how people and societies grapple with issues like responsibility, representation and participation, (in)equality, equity, ethics, faith, and so on, sometimes with attention to constructions of meanings of 'good', 'bad', 'desirable', 'justice' etc. (even if indirectly).

Integrating theories, methods, and principles across the full range of SSH is highly relevant for effective interdisciplinary R&I pursuing Societal Readiness.

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34 Foulds, C. & Robison, R. (2018). 'Mobilising the Energy-Related Social Sciences and Humanities', In: Foulds, C. & Robison, R. (eds.) Advancing Energy Policy: Lessons on the Integration of Social Sciences and Humanities. Cham: Palgrave Macmillan. 1-12. https://doi.org/10.1007/978-3-319-99097-2

35 https://research-and-innovation.ec.europa.eu/research-area/social-sciences-and-humanities/ssh-integration_en

36 Academy of Social Sciences, in: https://acss.org.uk/what-is-social-science/

Calls for proposals

Call - Cluster 5 Call 03-2026 (WP2026-2027)

HORIZON-CL5-2026-03

Overview of this call[37]

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

Topics	Type of Action	Budgets (EUR million) 2026	Expected EU contribution per project (EUR million)[38]	Indicative number of projects expected to be funded
Opening: 18 Dec 2025 Deadline(s): 31 Mar 2026				
Cross-sectoral solutions for the climate transition				
HORIZON-CL5-2026-03-D2-02: Development of direct recycling processes (BATT4EU Partnership)	RIA	14.32	Around 4.77	3
Sustainable, secure and competitive energy supply				
HORIZON-CL5-2026-03-D3-01: Targeting key value chain components for increasing the competitiveness of renewable energy technologies in Europe	RIA	9.00	Around 3.00	3
HORIZON-CL5-2026-03-D3-13: Long-lifetime and optimised use of materials in recyclable Ag and In-free Si PV modules (EUPI-PV Partnership)	RIA	15.00	Around 5.00	3
HORIZON-CL5-2026-03-D3-14: Industrial processes and equipment for innovative,	IA	30.00	Around 10.00	3

[37] 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 2026 and 2027.

[38] Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

reliable and scalable tandem technologies (EUPI-PV Partnership)				
HORIZON-CL5-2026-03-D3-19: Grid-forming capabilities for more resilient and RES-based electricity grids	IA	20.00	Around 10.00	2
HORIZON-CL5-2026-03-D3-20: Affordable and sustainable primary equipment for Future-Ready multi-terminal HVDC Systems	IA	24.00	4.00 to 12.00	3
HORIZON-CL5-2026-03-D3-21: Hybrid AI-Control Framework for a next-generation grid-scale energy storage and system integration	IA	14.00	Around 7.00	2
HORIZON-CL5-2026-03-D3-22: Novel solutions for off-grid storage of renewable energy for critical infrastructures	RIA	12.00	Around 4.00	3
HORIZON-CL5-2026-03-D3-23: AI-driven forecasting algorithms for Grid and Consumer friendly Energy Sharing – Societal Readiness pilot	IA	12.00	Around 6.00	2
HORIZON-CL5-2026-03-D3-30: Pre-commercial appraisal for CO2 aquifer storage	IA	25.00	Around 5.00	5
Overall indicative budget		175.32		

General conditions relating to this call	
Admissibility conditions	The conditions are described in General Annex A.
Eligibility conditions	The conditions are described in General Annex B.
Financial and operational capacity and exclusion	The criteria are described in General Annex C.
Award criteria	The criteria are described in General Annex D.
Documents	The documents are described in General Annex E.

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Procedure	The procedure is described in General Annex F.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G.

Call - Cluster 5 Call 04-2026 (2-stage) (WP2026-2027)

HORIZON-CL5-2026-04-Two-Stage

Overview of this call[39]

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

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million)[40]	Indicative number of projects expected to be funded
		2026		
Opening: 18 Dec 2025 Deadline(s): 31 Mar 2026 (First Stage), 20 Oct 2026 (Second Stage)				
Sustainable, secure and competitive energy supply				
HORIZON-CL5-2026-04-Two-Stage-D3-02: Next generation of renewable energy technologies	RIA	24.00	Around 4.00	6
Overall indicative budget		24.00		

General conditions relating to this call	
Admissibility conditions	The conditions are described in General Annex A.

39 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 2026 and 2027.

40 Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

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

Call - Cluster 5 Call 05-2026 (WP2026-2027)

HORIZON-CL5-2026-05

Overview of this call[41]

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

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million)[42]	Indicative number of projects expected to be funded
		2026		
Opening: 18 Dec 2025 Deadline(s): 14 Apr 2026				
Clean and competitive solutions for all transport modes				

41 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 2026 and 2027.

42 Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

HORIZON-CL5-2026-05-D5-01: Large-scale demonstration of Heavy-Duty Battery Electric Vehicles (HD BEV) towards long-haul logistics operations (2ZERO Partnership)	IA	68.00	Around 34.00	2
HORIZON-CL5-2026-05-D5-02: Energy-efficient software-defined EVs (2ZERO Partnership)	IA	16.00	Around 16.00	1
HORIZON-CL5-2026-05-D5-07: AI-assisted digital aircraft design, manufacturing and MRO, towards a competitive aviation	RIA	10.00	Around 5.00	2
HORIZON-CL5-2026-05-D5-11: Scalability of Solid Oxide Fuel Cells for waterborne transport (topic in collaboration between the Zero-Emission Waterborne partnership and the Clean Hydrogen Joint Undertaking)	RIA	16.00	Around 8.00	2
HORIZON-CL5-2026-05-D5-12: Shipyards of the future (ZEWT Partnership)	IA	21.00	Around 10.50	2
HORIZON-CL5-2026-05-D5-13: Safety of renewable low and zero-carbon waterborne fuels in port areas: risk assessment, regulatory framework, and guidelines for safe bunkering, handling and storage (ZEWT partnership)	CSA	2.00	Around 2.00	1
HORIZON-CL5-2026-05-D5-14: Ports of the future (ZEWT Partnership)	IA	21.00	Around 10.50	2
Overall indicative budget		154.00		

General conditions relating to this call	
Admissibility conditions	The conditions are described in General Annex A.
Eligibility conditions	The conditions are described in General Annex B.
Financial and operational capacity and exclusion	The criteria are described in General Annex C.

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

Call - Cluster 5 Call 06-2026 (2-stage) (WP2026-2027)

HORIZON-CL5-2026-06-Two-Stage

Overview of this call[43]

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

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million)[44]	Indicative number of projects expected to be funded
		2026		
Opening: 18 Dec 2025 Deadline(s): 14 Apr 2026 (First Stage), 08 Oct 2026 (Second Stage)				
Clean and competitive solutions for all transport modes				
HORIZON-CL5-2026-06-Two-Stage-D5-10: Disruptive Technologies and Innovative Concepts for Energy Saving Onboard of long-distance ships (ZEWT Partnership)	RIA	15.00	Around 5.00	3

[43] 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 2026 and 2027.

[44] Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

HORIZON-CL5-2026-06-Two-Stage-D5-20: Non-exhaust emissions in road and railway transport	RIA	7.00	3.50 to 4.00	2
Overall indicative budget		22.00		

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

Call - Cluster 5 Call 07-2026 (WP2026-2027)

HORIZON-CL5-2026-07

Overview of this call[45]

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

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution	Indicative number of

[45] 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 2026 and 2027.

		2026	per project (EUR million)[46]	projects expected to be funded
Opening: 18 Dec 2025 Deadline(s): 15 Apr 2026				
Climate sciences and responses for the transformation towards climate neutrality				
HORIZON-CL5-2026-07-D1-01: Next generation climate monitoring and related capabilities	RIA	15.00	Around 5.00	3
HORIZON-CL5-2026-07-D1-02: Advancing European climate risk assessments	RIA	15.00	4.00 to 5.00	3
HORIZON-CL5-2026-07-D1-03: Economics of climate change and cost of inaction	RIA	20.00	4.00 to 5.00	4
HORIZON-CL5-2026-07-D1-04: Fighting disinformation and effectively communicating on climate change	RIA	15.00	4.00 to 5.00	3
HORIZON-CL5-2026-07-D1-05: Improving climate and weather models for Africa	RIA	21.00	Around 7.00	3
Overall indicative budget		86.00		

General conditions relating to this call	
Admissibility conditions	The conditions are described in General Annex A.
Eligibility conditions	The conditions are described in General Annex B.
Financial and operational capacity and exclusion	The criteria are described in General Annex C.
Award criteria	The criteria are described in General Annex D.
Documents	The documents are described in General Annex E.

[46] Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

Procedure	The procedure is described in General Annex F.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G.

Call - Cluster 5 Call 08-2026 (2-stage) (WP2026-2027)

HORIZON-CL5-2026-08-Two-Stage

Overview of this call[47]

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

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million)[48]	Indicative number of projects expected to be funded
		2026		
Opening: 18 Dec 2025 Deadline(s): 15 Apr 2026 (First Stage), 08 Oct 2026 (Second Stage)				
Climate sciences and responses for the transformation towards climate neutrality				
HORIZON-CL5-2026-08-Two-Stage-D1-06: Closing knowledge gaps on Earth system science in support of global and regional assessments and climate policy	RIA	45.00	5.00 to 9.00	7
Overall indicative budget		45.00		

General conditions relating to this call	
Admissibility conditions	The conditions are described in General Annex A.

47 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 2026 and 2027.

48 Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

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

Call - Cluster 5 Call 09-2026 (WP2026-2027)

HORIZON-CL5-2026-09

Overview of this call[49]

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

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million)[50]	Indicative number of projects expected to be funded
		2026		
Opening: 05 May 2026 Deadline(s): 15 Sep 2026				
Cross-sectoral solutions for the climate transition				

[49] 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 2026 and 2027.

[50] Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

HORIZON-CL5-2026-09-D2-01: Producing battery-grade materials for electrodes through sustainable processing and refining of raw materials or developing bio-based materials (BATT4EU Partnership)	RIA	28.64	Around 7.16	4
HORIZON-CL5-2026-09-D2-04: Coordinated topic with India on recycling of EV batteries	IA	9.55	Around 9.55	1
Efficient, sustainable and inclusive energy use				
HORIZON-CL5-2026-09-D4-01: Researching the technical, social & economic factors impacting the energy performance of Smart Buildings (Built4People Partnership)	RIA	16.50	Around 5.50	3
HORIZON-CL5-2026-09-D4-02: Low disturbance prefabrication approaches for deep renovation of multi-storey buildings (Built4People Partnership)	IA	28.00	Around 7.00	4
HORIZON-CL5-2026-09-D4-03: Advanced data platforms to integrate whole life carbon in building information tools, assessments, and certification (Built4People Partnership)	IA	16.50	Around 5.50	3
HORIZON-CL5-2026-09-D4-04: Validating policies and business models for affordable and sustainable housing (Built4People Partnership)	RIA	15.00	Around 5.00	3
HORIZON-CL5-2026-09-D4-08: Full-scale demonstration of heat upgrade solutions in industrial processes	IA	18.00	Around 9.00	2
Overall indicative budget		132.19		

General conditions relating to this call	
Admissibility conditions	The conditions are described in General Annex A.
Eligibility conditions	The conditions are described in General Annex B.

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

Call - Cluster 5 Call 10-2026 (WP2026-2027)

HORIZON-CL5-2026-10

Overview of this call[51]

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

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million)[52]	Indicative number of projects expected to be funded
		2026		
Opening: 04 Jun 2026 Deadline(s): 08 Oct 2026				
Cross-sectoral solutions for the climate transition				
HORIZON-CL5-2026-10-D2-03: Integrated Production and Product Development for Next-Generation Lithium-based Batteries for	IA	100.91 [53]	Around 33.63	3

[51] 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 2026 and 2027.

[52] Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

[53] Of which EUR 15.00 million from the 'Digital, Industry and Space' budget.

Mobility (BATT4EU and Made in Europe Partnerships)				
Safe, Resilient Transport and Smart Mobility services for passengers and goods				
HORIZON-CL5-2026-10-D6-01: Flagship-pilot: large-scale demonstrations of CCAM (CCAM Partnership)	IA	100.00	Around 100.00	1
HORIZON-CL5-2026-10-D6-02: Geopolitical competition and socioeconomic resilience in CCAM: an innovation and policy roadmap for EU leadership (CCAM Partnership)	RIA	4.00	Around 4.00	1
HORIZON-CL5-2026-10-D6-03: Generative AI for smarter CCAM: enhancing perception, decision-making, and validation (CCAM Partnership)	RIA	14.00	Around 7.00	2
HORIZON-CL5-2026-10-D6-06: Increasing competitiveness and resilience of multimodal freight transport and logistics for competitive supply chains	IA	21.00	Around 7.00	3
HORIZON-CL5-2026-10-D6-07: Supporting sustainable and smart urban mobility in Europe (CIVITAS)	CSA	4.00	Around 4.00	1
HORIZON-CL5-2026-10-D6-09: Road Safety and resilience of rural areas	IA	12.00	Around 6.00	2
HORIZON-CL5-2026-10-D6-10: Enhanced resilience in multimodal passenger transport through digital technologies and generative and discriminative AI	IA	10.00	Around 5.00	2
Overall indicative budget		265.91		

General conditions relating to this call	
Admissibility conditions	The conditions are described in General Annex A.
Eligibility conditions	The conditions are described in General Annex B.

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

Call - Cluster 5 Call 11-2026 (WP2026-2027)

HORIZON-CL5-2026-11

Overview of this call[54]

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

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million)[55]	Indicative number of projects expected to be funded
		2026		
Opening: 04 Aug 2026 Deadline(s): 01 Dec 2026				
Sustainable, secure and competitive energy supply				
HORIZON-CL5-2026-11-D3-03: Strategic Energy Technology (SET) Plan wind energy research and innovation joint programme	IA	93.50	Around 93.50	1

[54] 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 2026 and 2027.

[55] Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

HORIZON-CL5-2026-11-D3-04: De-risking renewable fuel technologies through transnational pre-commercial procurement of renewable fuel industrial value chains	PCP	40.00	Around 40.00	1
HORIZON-CL5-2026-11-D3-05: Demonstration of solid biofuel supply and conversion to large scale CHP from fully sustainable regional value chains	IA	14.00	Around 7.00	2
HORIZON-CL5-2026-11-D3-06: Concentrated solar thermal systems for decarbonising industrial processes	IA	12.00	Around 6.00	2
HORIZON-CL5-2026-11-D3-07: Resource assessment for deep sedimentary and basement reservoirs	RIA	19.00	Around 4.75	4
HORIZON-CL5-2026-11-D3-08: Inducement Prize - Lithium production from geothermal plants in Europe	CSA	4.50	Around 4.50	1
HORIZON-CL5-2026-11-D3-15: Improved system design for innovative PV applications (EUPI-PV Partnership)	IA	30.00	Around 7.50	4
HORIZON-CL5-2026-11-D3-24: Data sharing to support the training and development of AI foundation models in the energy sector	IA	30.00	Around 10.00	3
Overall indicative budget		243.00		

General conditions relating to this call	
Admissibility conditions	The conditions are described in General Annex A.
Eligibility conditions	The conditions are described in General Annex B.
Financial and operational capacity and exclusion	The criteria are described in General Annex C.
Award criteria	The criteria are described in General Annex D.

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Documents	The documents are described in General Annex E.
Procedure	The procedure is described in General Annex F.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G.

Call - Cluster 5 Call 01-2027 (WP2026-2027)

HORIZON-CL5-2027-01

Overview of this call[56]

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

Topics	Type of Action	Budgets (EUR million) 2027	Expected EU contribution per project (EUR million)[57]	Indicative number of projects expected to be funded
Opening: 17 Nov 2026 Deadline(s): 04 Mar 2027				
Climate sciences and responses for the transformation towards climate neutrality				
HORIZON-CL5-2027-01-D1-07: Advancing understanding, modelling and prediction of extreme events in a changing climate	RIA	18.00	Around 6.00	3
HORIZON-CL5-2027-01-D1-08: Palaeoclimate science for a better understanding of Earth system dynamics	RIA	14.00	Around 7.00	2

[56] 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 2026 and 2027.

[57] Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

HORIZON-CL5-2027-01-D1-09: Assessing the performance of policy instruments to inform climate change mitigation action	RIA	9.00	Around 3.00	3
HORIZON-CL5-2027-01-D1-10: Understanding and avoiding maladaptation to climate change	RIA	18.00	5.00 to 6.00	3
HORIZON-CL5-2027-01-D1-11: Africa-EU CO-FUND action on climate	COFUND	15.00	Around 15.00	1
HORIZON-CL5-2027-01-D1-12: Better understanding and attribution of land and ocean carbon sources and sinks	RIA	25.00	Around 5.00	5
HORIZON-CL5-2027-01-D1-13: Next generation scenarios for informing climate and sustainability transitions	RIA	24.00	Around 4.00	6
Overall indicative budget		123.00		

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

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Call - Cluster 5 Call 02-2027 (WP2026-2027)

HORIZON-CL5-2027-02

Overview of this call[58]

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

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million)[59]	Indicative number of projects expected to be funded
		2027		
Opening: 03 Dec 2026 Deadline(s): 31 Mar 2027				
Cross-sectoral solutions for the climate transition				
HORIZON-CL5-2027-02-D2-05: Improvement of Adaptability, Flexibility and Efficiency of Existing Recycling Processes (BATT4EU Partnership)	IA	19.09	Around 9.55	2
HORIZON-CL5-2027-02-D2-06: Sustainable and Competitive Cell Production Techniques for Lithium-ion And Sodium-ion Batteries (BATT4EU Partnership)	IA	38.18	Around 19.09	2
Sustainable, secure and competitive energy supply				
HORIZON-CL5-2027-02-D3-09: Co-funding Strategic Energy Technology (SET) Plan renewable fuel value chains at EU, national, regional, and local level	COFUND	30.00	Around 30.00	1

[58] 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 2026 and 2027.

[59] Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

HORIZON-CL5-2027-02-D3-10: Innovative technologies and solutions to improve wave and tidal energy systems	IA	44.00	Around 44.00	1
HORIZON-CL5-2027-02-D3-11: Renewable Energy Valleys in Africa to increase energy security and energy access in Africa	IA	9.00	Around 4.50	2
HORIZON-CL5-2027-02-D3-16: Production technologies for solar photovoltaics beyond the state-of-the-art (EUPI-PV Partnership)	IA	36.00	Around 12.00	3
HORIZON-CL5-2027-02-D3-25: Large scale operational validation and upscaling of state-of-the-art (Generative) AI tools and models powering a next generation digital energy system	IA	20.00	Around 10.00	2
HORIZON-CL5-2027-02-D3-31: Advancements in Direct Air Capture	IA	17.00	Around 8.50	2
HORIZON-CL5-2027-02-D3-32: Support to the implementation of an EU policy framework for CO2 transport and storage infrastructure	CSA	5.00	Around 5.00	1
Overall indicative budget		218.27		

General conditions relating to this call	
Admissibility conditions	The conditions are described in General Annex A.
Eligibility conditions	The conditions are described in General Annex B.
Financial and operational capacity and exclusion	The criteria are described in General Annex C.
Award criteria	The criteria are described in General Annex D.
Documents	The documents are described in General Annex E.

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Procedure	The procedure is described in General Annex F.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G.

Call - Cluster 5 Call 03-2027 (WP2026-2027)

HORIZON-CL5-2027-03

Overview of this call[60]

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

Topics	Type of Action	Budgets (EUR million) 2027	Expected EU contribution per project (EUR million)[61]	Indicative number of projects expected to be funded
Opening: 15 Dec 2026 Deadline(s): 14 Apr 2027				
Clean and competitive solutions for all transport modes				
HORIZON-CL5-2027-03-D5-03: Data-driven circular economy for e-mobility ecosystem (2ZERO Partnership)	IA	24.00	5.00 to 7.00	4
HORIZON-CL5-2027-03-D5-04: Demonstration of zero emission coaches and buses in long distance operations (2ZERO Partnership)	IA	15.00	Around 15.00	1
HORIZON-CL5-2027-03-D5-05: Higher Voltage, Megawatt Charging System compatible, modular powertrain for Heavy Duty Vehicles (HDV) (2ZERO Partnership)	IA	16.00	Around 8.00	2

60 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 2026 and 2027.

61 Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

HORIZON-CL5-2027-03-D5-06: Fire prevention and mitigation for EVs in confined areas (2ZERO Partnership)	IA	8.00	Around 8.00	1
HORIZON-CL5-2027-03-D5-08: Sustainable aircraft circular design and additive manufacturing, towards a climate neutral aviation	RIA	5.00	Around 2.50	2
HORIZON-CL5-2027-03-D5-15: Prospective evaluation of nuclear power potential for shipping (ZEWT Partnership)	CSA	2.00	Around 2.00	1
HORIZON-CL5-2027-03-D5-16: Autonomous vessels in short sea shipping and inland waterways	IA	15.00	Around 7.50	2
HORIZON-CL5-2027-03-D5-17: Innovative Solutions for mitigating the environmental impact of waterborne transport in marine and aquatic Ecosystems (ZEWT Partnership)	RIA	14.00	Around 7.00	2
HORIZON-CL5-2027-03-D5-18: Enhanced electric operation and battery durability (ZEWT Partnership)	IA	20.00	Around 10.00	2
HORIZON-CL5-2027-03-D5-19: Onboard renewable energy solutions and energy saving measures to reduce the fuel consumption of ships by at least 55% (ZEWT Partnership)	IA	8.00	Around 8.00	1
HORIZON-CL5-2027-03-D5-21: Assessing the effect of airport operations on air quality and noise in nearby communities	RIA	7.00	Around 3.50	2
Overall indicative budget		134.00		

General conditions relating to this call	
Admissibility conditions	The conditions are described in General Annex A.
Eligibility conditions	The conditions are described in General Annex B.

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

Call - Cluster 5 Call 04-2027 (2-stage) (WP2026-2027)

HORIZON-CL5-2027-04-Two-Stage

Overview of this call[62]

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

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million)[63]	Indicative number of projects expected to be funded
		2027		
Opening: 15 Dec 2026 Deadline(s): 14 Apr 2027 (First Stage), 07 Oct 2027 (Second Stage)				
Cross-sectoral solutions for the climate transition				
HORIZON-CL5-2027-04-Two-Stage-D2-07: Novel approaches towards next-generation battery concepts, leveraging the	RIA	48.18 [64]	Around 4.82	10

62 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 2026 and 2027.

63 Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

64 Of which EUR 10.00 million from the 'Digital, Industry and Space' budget.

enabling role of innovative advanced materials (BATT4EU and IAM4EU Partnerships)				
Clean and competitive solutions for all transport modes				
HORIZON-CL5-2027-04-Two-Stage-D5-09: Noise reduction breakthroughs for new ultraefficient aircraft	RIA	5.00	Around 2.50	2
Overall indicative budget		53.18		

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

Call - Cluster 5 Call 05-2027 (WP2026-2027)

HORIZON-CL5-2027-05

Overview of this call[65]

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

[65] 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.

Topics	Type of Action	Budgets (EUR million) 2027	Expected EU contribution per project (EUR million)[66]	Indicative number of projects expected to be funded
Opening: 05 May 2027 Deadline(s): 15 Sep 2027				
Cross-sectoral solutions for the climate transition				
HORIZON-CL5-2027-05-D2-08: Demonstration for Long-duration Battery Energy Storage Systems (BATT4EU Partnership)	IA	19.09	Around 9.55	2
Efficient, sustainable and inclusive energy use				
HORIZON-CL5-2027-05-D4-05: On-site robotic and automated techniques for building renovation and new construction	IA	20.25	Around 6.75	3
HORIZON-CL5-2027-05-D4-06: Thermal energy optimisation and waste heat recovery of high energy demand IT rooms in buildings or small edge data centres	IA	15.75	Around 5.25	3
HORIZON-CL5-2027-05-D4-07: Integrating circularity in LCA-based modelling frameworks for renovation of buildings (Built4People Partnership)	IA	27.00	Around 6.75	4
HORIZON-CL5-2027-05-D4-09: Demonstration of industrial excess/waste heat conversion to mechanical or electrical power	IA	14.00	Around 7.00	2
Overall indicative budget		96.09		

General conditions relating to this call

The budget amounts are subject to the availability of the appropriations provided for in the general budget of the Union for 2026 and 2027.

66 Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

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

Call - Cluster 5 Call 06-2027 (WP2026-2027)

HORIZON-CL5-2027-06

Overview of this call[67]

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

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million)[68]	Indicative number of projects expected to be funded
		2027		
Opening: 03 Jun 2027 Deadline(s): 07 Oct 2027				

[67] 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 2026 and 2027.

[68] Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

Safe, Resilient Transport and Smart Mobility services for passengers and goods				
HORIZON-CL5-2027-06-D6-04: Holistic solutions for CCAM integration in critical scenarios (CCAM Partnership)	RIA	6.00	Around 6.00	1
HORIZON-CL5-2027-06-D6-05: European CCAM knowledge hub and tools for safe and scalable deployment (CCAM Partnership)	CSA	4.00	Around 4.00	1
HORIZON-CL5-2027-06-D6-08: Enhancing Mobility for All: affordable, reliable, and accessible multimodal transport for inclusive rural and urban connectivity – Societal Readiness pilot	IA	21.00	Around 7.00	3
HORIZON-CL5-2027-06-D6-11: Enhancing Resilience and Accuracy in Positioning, Navigation, and Timing (PNT) Systems and e-conspicuity solutions	IA	5.00	Around 5.00	1
HORIZON-CL5-2027-06-D6-12: Support for dissemination events in the field of Transport Research	CSA	1.50	Around 1.50	1
Overall indicative budget		37.50		

General conditions relating to this call	
Admissibility conditions	The conditions are described in General Annex A.
Eligibility conditions	The conditions are described in General Annex B.
Financial and operational capacity and exclusion	The criteria are described in General Annex C.
Award criteria	The criteria are described in General Annex D.
Documents	The documents are described in General Annex E.
Procedure	The procedure is described in General Annex F.

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Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G.

Call - Cluster 5 Call 07-2027 (WP2026-2027)

HORIZON-CL5-2027-07

Overview of this call[69]

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

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million)[70]	Indicative number of projects expected to be funded
		2027		
Opening: 04 Aug 2027 Deadline(s): 01 Dec 2027				
Sustainable, secure and competitive energy supply				
HORIZON-CL5-2027-07-D3-12: Demonstration of hydropower technologies for efficient and forward-looking refurbishment of existing hydropower plants	IA	17.00	Around 8.50	2
HORIZON-CL5-2027-07-D3-17: Industrial scale up and circularity pathway for IPV technologies (EUPI-PV Partnership)	IA	33.00	Around 11.00	3
HORIZON-CL5-2027-07-D3-18: PV based electrification of the economy: Designing & optimising PV systems supporting industrial electrification and promoting participation in electricity markets (EUPI-PV Partnership)	IA	18.00	Around 6.00	3

69 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 2026 and 2027.

70 Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

HORIZON-CL5-2027-07-D3-26: Advanced TSO control rooms to enhance grid observability, stability and resilience	IA	29.00	Around 9.50	3
HORIZON-CL5-2027-07-D3-27: Advanced Distribution Management Systems (ADSM) for more efficient and flexible distribution grids	IA	29.00	Around 9.50	3
HORIZON-CL5-2027-07-D3-28: Integrated Approaches for Retrofitting Infrastructures with Innovative Energy Storage Technologies	IA	24.00	Around 8.00	3
HORIZON-CL5-2027-07-D3-29: Community of practice - Data-Driven Decision-Making in Energy	CSA	6.00	Around 6.00	1
HORIZON-CL5-2027-07-D3-33: Delivery of industrial CCUS clusters – Societal Readiness pilot	IA	30.00	Around 10.00	3
Overall indicative budget		186.00		

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

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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*".

Expected impacts:

Research should contribute to **closing major knowledge gaps** on the changing climate together with their associated impacts and risks, on both society and nature. It should also help **develop 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 just transition, territorial cohesion and leaving no one behind.

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

1. **Support to climate action (both mitigation and adaptation) in Europe and globally**, through advancing climate science and the knowledge base underpinning actionable solutions, to accelerate the transition to a climate-neutral, climate-resilient and prosperous society.

2. **Closing key knowledge gaps related to climate change**, thereby contributing substantially to key European and international assessments such as IPCC, IPBES, EUCRA, and other initiatives such as the Coupled Model Intercomparison Project (CMIP) and the Coordinated Regional Climate Downscaling Experiment (CORDEX) under the World Climate Research Programme.

3. **Strengthening the European Research Area on climate change** by boosting scientific excellence and capacity in an inclusive manner across the participating countries.

4. **Maximising synergies between mitigation and adaptation and with other policy priorities** such as biodiversity and ecosystem preservation and restoration, digitalisation, circular economy, prosperity and competitiveness, strategic autonomy, security and resilience, just transition, and the Sustainable Development Goals by exploring co-benefits, trade-offs and potential unintended consequences of climate strategies and policy interventions.

Important components of climate science research are also addressed in other Clusters - particularly Cluster 6 – which addresses the climate-ocean-cryosphere-polar nexus and the climate-energy-land-food-water-biodiversity nexus. Efforts to foster synergies and complementarities across these research activities are strongly encouraged.

DRAFT

Proposals are invited against the following topic(s):

HORIZON-CL5-2026-07-D1-01: Next generation climate monitoring and related capabilities

Call: Cluster 5 Call 07-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 15.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Procedure	The procedure is described in General Annex F. The following exceptions apply: To ensure a balanced portfolio covering all the areas described in the scope section (A, B and C), grants will be awarded to applications not only in order of ranking but at least also to one proposal that is the highest ranked within each priority area, provided that the corresponding applications attain all thresholds. Proposals should clearly indicate the research area they have selected.
Legal and financial set-up of the Grant Agreements	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) [71].

[71] 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

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

- Climate data are improved both spatially and temporally, physically more consistent and better exploited across a wide range of users, stakeholders and regions;
- EU contribution to climate change assessments and climate monitoring is enhanced;
- Climate information distillation is facilitated by innovative methods to provide useful information to policy making in a more efficient way.

Scope: Climate monitoring of Essential Climate Variables[72] at global and regional scales is crucial to assess the state of our climate, its variability and change, and to track progress towards the goals of the Paris Agreement and the corresponding EU climate objectives. Underlying elements, in particular climate data records, reanalyses and forcings, are fundamental to climate science and serve multiple applications across weather, climate, environmental and sectoral domains, generating societal benefits. In turn, methods to distil information from this wealth of data can help extract relevant knowledge and key messages for climate policymaking.

Proposals should address only one of the following priority areas, which must be clearly indicated:

A. Next generation climate data records

Actions should advance innovative methods to enhance, expand and update climate data records; exploit recently rescued and/or new data streams; develop innovative methods to improve the water-energy-carbon cycle physical and bio-geochemical consistency across data records; and improve their applicability for users.

B. Next generation Earth system reanalyses

Actions should undertake research to prepare for the next generation global and European high resolution climate reanalyses. Progress is expected in enhanced data assimilation methods, further coupling the Earth system components, expanding atmospheric composition reanalysis backward in time, piloting carbon-energy-water cycle reanalyses, exploring data-driven methods for reanalyses, and applying such improvements in subsequent applications and international initiatives.

C. Next generation climate forcing and emission data sets

Actions are expected to conduct research to ensure more updated and sustained production, and quality assurance procedures of climate forcings and emissions data sets in support of international climate change assessments and climate simulations, including harmonization between forcing and emission data sets (historical and scenarios).

[72] GCOS Essential Climate Variables

All actions should promote the development and use of new, rescued or proxy data streams, and innovative digital tools and methods, including AI-based, to transform climate data into actionable knowledge. These efforts should align with, build upon, and support global intercomparison and coordination frameworks such as CMIP, promoting standardisation, accessibility and utility of climate information across climate science and service user communities, with due consideration of FAIR principles.

Noting the current divestment of the US in climate and environmental related monitoring networks, which may severely impact climate research and services worldwide, proposers are requested to dedicate resources to the assessment and mitigation of such impacts towards increased resilience of climate monitoring at European and global scale.

Research areas of particular interest include new data mining capabilities to facilitate the identification of events and areas of interest, anomalous climate behaviours, unexpected trends, etc. within those data sets. Equally welcome are methods to automate regular and consistent climate reporting along agreed climate indicators, to distil useful climate information (i.e. climate intelligence), and to derive knowledge tailored to relevant users (e.g. for sectoral applications and assessment such as biodiversity monitoring and ecosystem management), from expert users to policy makers and the general public.

International cooperation in the context of WCRP[73], GCOS[74], IAMC[75], and close coordination and complementarity with Copernicus, Destination Earth, and relevant agencies are strongly encouraged.

HORIZON-CL5-2026-07-D1-02: Advancing European climate risk assessments

Call: Cluster 5 Call 07-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 15.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of

73 https://www.wcrp-climate.org/
74 https://gcos.wmo.int/site/global-climate-observing-system-gcos
75 https://www.iamconsortium.org/

	Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Legal and financial set-up of the Grant Agreements	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) [76].

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

- The implementation of the European Adaptation Strategy, European Climate Adaptation Plan, EU Mission on Adaptation to Climate Change (along with other Green Deal Missions), Preparedness Union Strategy, and national adaptation efforts are informed with the latest scientific evidence and enhanced through tailored decision-support tools.
- Knowledge gaps identified in the EU Climate Risk Assessments (EUCRA)[77] and latest IPCC assessments are narrowed, including system specific, region specific and cross-cutting gaps, so that the future EUCRAs benefit from a significant reduction of current risk assessment limitations and useful knowledge is available for various policymaking contexts.

Scope: The development and implementation of climate adaptation strategies and plans of the EU and Member States rely on the most accurate and decision-useful assessments of climate risks that science can provide. For this purpose, the new knowledge feeding future EUCRAs will be essential. In the first report, a number of gaps in terms of knowledge and action, and corresponding recommendations are highlighted to underpin more effective EU policy intervention to manage climate risks, stressing the importance of a systemic approach to climate risk assessments, adaptation and resilience and of the interaction with non-climate risk drivers (e.g. such as biodiversity loss and ecosystem degradation).

To support the future EUCRAs and advance adaptation and climate preparedness, actions should improve the understanding and quantification of climate risks, their underlying drivers, and reduce associated uncertainties for different systems and regions. New knowledge should be integrated to assess the risks of wildcards (high impact low probability or black swan events), crossing of tipping points and transboundary, compound and cascading risks in a way that can facilitate decision-making.

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[76] 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

[77] https://www.eea.europa.eu/en/analysis/publications/european-climate-risk-assessment

Evidence from recent experiences of materialised climate risks and the performance of adaptation efforts, encompassing the whole range from failure to success and including the role of behavioural aspects, should be mapped and analysed to improve understanding of the key factors that determine effective environmental and social resilience, preparedness and adaptation capacity[78]. However, developing context-specific adaptation strategies is out of the scope of this topic.

The main focus is tackling knowledge gaps identified in the EUCRA. Actions should extend and improve the evidence base by retrieving inputs from relevant end-users, including local and regional authorities, and civil society organisations. While general aspects should cover the whole EU, actions should also improve understanding of sub-European and national to local specific risks. Actions should enhance methodologies and tools for risk assessment, making the outputs available through user-oriented EU portals. For these purposes, proposals should:

- Address at least two systems or sectors (e.g. ecosystems, food, health, infrastructures, energy, water, economy and finance, etc.) that interact and have transboundary effects.
- Include study cases at sub-European scale. While all the cases together should cover the 4 regions defined in EUCRA[79], some of the individual cases should also address the transnational dimension (i.e. include more than one country of the particular region).

Actions should contribute to future editions of EUCRA. Specific resources should be devoted to this purpose. Actions should leverage recent advances on other climate risk assessments and related frameworks from reliable sources (e.g. the World Climate Research Programme, WCRP).

Actions are encouraged to integrate multiple data sources and to leverage digital technologies, such as AI/ML techniques, tools, and models, including those developed under the European Commission's Destination Earth initiative, if appropriate.

Coordination and collaboration with the most relevant projects from Mission Adaptation, Cluster 5 Destination 1 on Climate Science and Responses is encouraged, especially for evidence retrieval, national to local scale assessment, methodological consistency, and cross-fertilisation through project scientific boards; and with projects from Cluster 3 Destination Disaster-Resilient Society for Europe for knowledge exchange and better integration of end-user perspectives. Actions are encouraged to make use of the European research infrastructures including Integrated Research Infrastructure Services for Climate Change Risks[80], if appropriate.

HORIZON-CL5-2026-07-D1-03: Economics of climate change and cost of inaction

Call: Cluster 5 Call 07-2026 (WP2026-2027)

78 See for instance the report "Safer together: A path towards a fully prepared Union - European Commission"

79 Northern, Western, Central-eastern and Southern Europe as considered in the EUCRA report.

80 https://www.iriscc.eu/

Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 20.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). For Area A-Global, the consortium must include as beneficiary at least three independent legal entities established in three different low or middle-income countries[81].
Procedure	The procedure is described in General Annex F. The following exceptions apply: To ensure a balanced portfolio covering different research areas (A and B), grants will be awarded to applications not only in order of ranking but also to fund at least two highest ranked applications in each area, provided that the corresponding applications attain all thresholds. Proposals should clearly indicate the research area they have selected.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: 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. 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

[81] https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lendinggroups ; standard Horizon Europe funding rules apply - only participants from some of these countries are automatically eligible for funding

	Research and Training Programme of the European Atomic Energy Community (2021-2025) [82].

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

- A more robust understanding of the costs of climate inaction and their distribution, accounting for climate change impacts, foregone co-benefits such as health and biodiversity related, and increased adaptation needs, stimulating higher levels of climate ambition.
- Greater consistency in how socio-economic and physical science disciplines address climate change with enhanced inter- and transdisciplinary collaboration leading to improved, more realistic and more context-specific, regionally differentiated assessments of socio-economic impacts of climate change, and tailored tools to better inform strategic decisions on climate action, security and resilience by public and private actors.
- Knowledge on the interactions between climate change impacts, climate action and global and regional economic performance is advanced. More clarity is gained on the implications of climate change and climate policies on European competitiveness, economic security and strategic autonomy, with enhanced assessment of opportunities, risks, benefits and costs for the EU economy and citizens.
- The Paris Agreement, European Climate Risk Assessments (EUCRA), the European Climate Adaptation Plan, the Preparedness Union Strategy, the Clean Industrial Deal, IPCC, IPBES and other initiatives are informed and supported with best available evidence and policy recommendations.

Scope: As emphasized by the IPCC, it is urgent to better understand the benefits and opportunities associated with deep, rapid and sustained mitigation and accelerated adaptation action to inform strategic decisions. Comprehensive assessments of the socio-economic impacts of climate change are essential for this, however, current approaches face significant challenges with a wide uncertainty in global damage estimates, fragmentation, lack of comparability across methodologies, and reliance on extrapolation from historical data, increasingly unrealistic in the context of current unprecedented changes in the climate system.

Actions should develop and enhance models, methods, and tools to improve the understanding of future socio-economic costs of climate inaction (for the purpose of this topic defined as insufficient, or delayed action), advancing novel approaches and frameworks to address the limitations in existing methodologies, integrating latest scientific evidence, diverse data sources and applicable to various conditions and contexts. In this context, actions are encouraged to leverage emerging digital capabilities, including, if appropriate, those developed under

[82] 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

initiatives like Destination Earth. Research should account for the full spectrum of climate impacts, such as those from extreme and low-probability high-impact events and the consequences of trespassing Earth system tipping points, to ensure more comprehensive and accurate assessments. Cascading and compound effects as well as non-market impacts (e.g. health, biodiversity and ecosystems, migration) should be considered. Actions should also contribute to rethinking discount rates and damage functions to better reflect the long-term uncertainty of climate impacts and their implications.

Actions should assess foregone co-benefits and missed opportunities of climate inaction, and their distribution, ranging from health-related gains to economic benefits like business and industrial opportunities, job creation, energy and economic security, innovation and lower costs, as well as environmental and social improvements such as from biodiversity conservation, and reduced inequalities. They should assess increased adaptation needs and costs associated with inadequate mitigation, accelerated climate impacts, lost resilience, crossing of adaptation limits as well as the impact on public budgets[83]. To provide the full picture, the cost of climate inaction should be compared with the cost of ambitious mitigation and adaptation.

Actions should emphasise treatment of uncertainty, ethics, inequality and justice in the economic analysis of climate change. They should explore approaches more compatible with planetary boundaries, going beyond traditional welfare and cost-effectiveness models.

This topic requires interdisciplinary collaboration between physical scientists, economists and other relevant SSH disciplines. Actions should include a process of co-design with stakeholders (e.g., representatives of governments, public administrations, such as civil protection competent authorities, or the private sector) to support uptake of the results.

Actions should focus on one of the following research areas:

Area A: Global

Analysis should be global in scale, while also providing regionally resolved insights to enable comparisons across world regions, distinguishing between developing and developed, and duly reflecting diverse circumstances and contexts. International cooperation is generally encouraged and specifically required with low and middle-income countries – particularly major GHG emitters[84] such as China (under the EU-China Climate Change and Biodiversity (CCB) flagship initiative), India, Brazil and Indonesia - to produce robust, representative and widely accepted estimates, and to support scientific capacity building.

Area B: The EU

Actions should focus on the EU. Particular attention should be given to consequences for EU industrial performance, security of supply and strategic autonomy.

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83 For example, the proposals could build upon the joint World Bank and European Commission reports on disaster and climate resilience: Economics for Disaster Prevention and Preparedness

84 https://edgar.jrc.ec.europa.eu/report_2024?vis=ghgtot#emissions_table

All projects funded under this topic are strongly encouraged to collaborate and envisage clustering activities together and with other relevant projects in and outside of Horizon Europe.

HORIZON-CL5-2026-07-D1-04: Fighting disinformation and effectively communicating on climate change

Call: Cluster 5 Call 07-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 15.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Legal and financial set-up of the Grant Agreements	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) [85].

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

- Advanced knowledge and understanding on the dynamics of disinformation and climate policy backlash from a communication perspective;

[85] 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

- Tools and products are developed for public authorities, media and civil society to detect and combat the influence and spread of climate change-related disinformation at scale;
- Tailored, innovative and effective communication techniques, tools and materials are developed, tested, disseminated, and evaluated, to better communicate with and engage citizens on climate change, climate action and climate policies;
- Acceptance of climate action is increased, democratic processes and societal resilience are strengthened and sustained behavioural change is progressed, through higher trust in climate science and improved climate literacy.

Scope: Climate change science is well-established and increasingly relevant to daily life and societal welfare. However, effectively communicating both the science and the necessary climate actions remains a significant challenge. Particularly challenging is understanding and addressing the spread of misinformation, disinformation, and political misinterpretation. There is also a crucial need for a strengthened public trust in science and in democracy, and for evidence-based climate communication strategies that foster a sense of agency through empowering and positive narratives. Complex messages should be made accessible, relevant, and reliable to non-specialist audiences.

Actions are expected to advance the understanding of the sources, channels, types, and influence of misinformation and disinformation on the public perception and assimilation of climate change-related information. The role of AI should also be investigated. Actions should identify, develop, and test strategies for the public and private sectors to detect, monitor and counteract false information. Such tools and products should be made available for policymakers, companies and the general public to incentivise and equip society to critically assess climate change-related information online and offline.

Research is expected to explore how to bridge the gap from climate knowledge and awareness to behavioural change, taking into consideration various factors that shape perceptions across different segments of the society. Actions should generate knowledge and develop innovative, engaging, tailored and multilingual tools, learning techniques, and narratives for impactful climate change communication frameworks at scale. Best-practice examples on European and international level should be retrieved. Climate scientists should be trained to effectively communicate with non-specialist audiences, including policymakers and other stakeholders. Research should investigate how to design and implement targeted communication campaigns that boost climate awareness and preparedness while preventing climate anxiety, promote clear and transparent knowledge on the scientific process and climate policymaking, and counteract disinformation. This includes fostering the ability to interpret uncertainties. Citizen engagement, youth in particular, is encouraged.

Actions should develop communication strategies, tools and products tailored to real-world context and societal needs, to combat disinformation and enhance climate communication. They should demonstrate clear pathways for uptake and scaling—such as piloting with end-users and integration into existing platforms or frameworks. Leveraging visual and digital tools,

including AI, and cooperating with the private sector, in particular innovative SMEs, is strongly encouraged.

The primary focus of actions should be on Europe, with local and national foci as appropriate, while other regions may be used for framing information. International cooperation is encouraged, especially with the United States and the Global South[86].

This research requires a multi-faceted, interdisciplinary approach drawing on insights from the natural sciences, social sciences and humanities (SSH) including behavioural sciences and gender, media studies, and communication theory.

All projects funded under this topic are strongly encouraged to collaborate and envisage clustering activities together and with other relevant projects in and outside of Horizon Europe. Collaboration with the EU Missions on Adaptation to Climate Change and on Climate neutral and Smart Cities is recommended when performing empirical work. Proposals should earmark the necessary resources for these purposes.

HORIZON-CL5-2026-07-D1-05: Improving climate and weather models for Africa

Call: Cluster 5 Call 07-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 21.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). At least 30% of the beneficiaries must be legal entities established in the African Union member states[87].
Legal and financial set-up of	The rules are described in General Annex G. The following exceptions apply:

86 In absence of a single formal definition of the Global South, the list of low- to middle-income countries automatically eligible for Horizon Europe funding should be used for this purpose – see the Horizon Europe List of Participating Countries on EU Funding and Tenders Portal for up-to-date information.

87 "African Union member states" excludes countries whose membership has been temporarily suspended.

the Grant Agreements	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. 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) [88].

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

- Improved quality and performance of weather and climate models over Africa, tailored to the continent's needs, enabling more effective adaptation actions and disaster risk response strategies, and informing the implementation of the international dimension of the EU Adaptation and Preparedness Union Strategies, the Sendai Framework for Disaster Risk Reduction, the Nairobi Declaration and the Team Europe Initiative on Adaptation and Resilience in Africa[89];
- Enhanced provision of weather predictions and climate projections that enable African communities to more effectively respond to the escalating impacts of climate change, contributing to the objectives of the AU-EU Partnership on Climate Change and Sustainable Energy[90];
- African climate research is bolstered, supporting the development of the next generation of climate scientists. There is reduced reliance on external expertise, increased representation of African science and scientists in international platforms such as the IPCC and UNFCCC, and enhanced African contribution to global climate initiatives such as CMIP, CORDEX and ISIMIP.

Scope: Africa is among the regions most severely affected by climate change, mostly due to high vulnerability and low adaptive capacity. While significant advancements in global weather and climate science have transformed resilience efforts elsewhere, their benefits in Africa

88 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

89 Climate Change Adaptation & Resilience - Africa | Capacity4dev

90 https://research-and-innovation.ec.europa.eu/strategy/strategy-research-and-innovation/europe-world/international-cooperation/regional-dialogues-and-international-organisations/eu-africa-cooperation/partnership-climate-change-and-sustainable-energy-ccse_en

remain to be harnessed, to unlock the continent's ability to address climate challenges more effectively.

Actions should address critical knowledge gaps for improving weather and climate modelling for Africa in the context of changing climate, with focus on the understanding and representation of weather and climate dynamics in Africa at regional, interregional or continental scale. They should enhance models' predictive skill and reduce uncertainties in key areas such as rainfall and extreme weather events. Actions should harness observational data to advance process-based understanding and model performance across various Earth System components (e.g. land, ocean, atmosphere). This includes improving data collection, assimilation and quality assurance practices, integration of local and rescued historical data to provide high-quality inputs for models. Actions are encouraged to leverage digital technologies, including AI/ML techniques, tools, and models as well as advances in high performance computing to achieve the topic's goals.

The research should be performed in close cooperation and co-creation between African and European teams in a way to ensure relevance, acceptance and co-ownership of solutions by African stakeholders. Actions are also expected to contribute to local capacity-building and knowledge exchange to support competence growth and equip African researchers with the data, tools and expertise necessary to sustain future progress. Strong partnerships should be established between relevant institutions in both regions such as universities, research bodies, National Meteorological and Hydrological Services (NMHSs) and African Regional Climate Centers (RCCs)[91] to enable mutual learning and collaborations.

Synergies and complementarity should be sought with other relevant EU-supported initiatives on climate modelling and capacity development in Africa such as Regional Centres of Excellence related to the green transition[92]. Additionally, actions should facilitate access of African researchers to cutting-edge European research infrastructures including supercomputing assets and data repositories to strengthen institutional and regional expertise and capacity.

All projects funded under this topic are strongly encouraged to collaborate and envisage clustering activities together and with other relevant projects in and outside of Horizon Europe.

HORIZON-CL5-2026-08-Two-Stage-D1-06: Closing knowledge gaps on Earth system science in support of global and regional assessments and climate policy

Call: Cluster 5 Call 08-2026 (2-stage) (WP2026-2027)
Specific conditions

[91] Africa Regional Climate Centers | AFRI-RES
[92] About the Project | Africa Knowledge Platform

Expected EU contribution per project	The Commission estimates that an EU contribution of between EUR 5.00 and 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.
Indicative budget	The total indicative budget for the topic is EUR 45.00 million.
Type of Action	Research and Innovation Actions
Admissibility conditions	The conditions are described in General Annex A. The following exceptions apply: Applicants submitting a proposal for a blind evaluation (see General Annex F) must not disclose their organisation names, acronyms, logos nor names of personnel in the proposal abstract and Part B of their first-stage application (see General Annex E).
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Procedure	The procedure is described in General Annex F. The following exceptions apply: The first-stage proposals of this topic will be evaluated blindly.
Legal and financial set-up of the Grant Agreements	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) [93].

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

- Improved quality and reduced uncertainty of global and regional climate change projections;

[93] 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

- Critical knowledge and data gaps in Earth system science as identified in the IPCC Sixth Assessment Report (AR6) and other authoritative sources, are addressed, ensuring that future climate assessments are grounded in the most comprehensive and up-to-date scientific evidence;

- New climate science evidence is generated that is relevant for policy needs and for informing climate action.

Scope: The global community's ability to mitigate and adapt to climate change requires the continuous advancement of climate science and related disciplines. International climate policy is informed primarily by the assessments made by the Intergovernmental Panel on Climate Change (IPCC), which provide the most comprehensive and authoritative evaluation of the state of knowledge on climate science, including the Earth's climate system and its expected changes under different scenarios. Despite the exponential increase of available data, other evidence and knowledge accumulated on these issues, there remain significant gaps in our understanding of key issues and processes. These may include factors such as insufficient or divergent evidence, low confidence findings or high uncertainties. Some of these gaps are identified in AR6 (specifically, in Working Group I contribution), "The Next Frontier for Climate Change Science"[94] and other relevant sources. Moreover, science has progressed since the closing of the evidence base used for AR6, raising new questions and avenues for inquiry.

Proposals under this topic should seek to narrow the knowledge gaps in the realm of Earth system science (understood here as the scope of Working Group I of the IPCC), offering flexibility for applicants to define the specific research areas targeted. Proposals are expected to focus on issues clearly within the scope of Cluster 5, Destination 1, and not prominently addressed by other topics of the 2025 and 2026-2027 Work Programmes, encouraging new scientific insights and approaches, and the involvement of researchers and entities new to Horizon Europe. Successful proposals are expected to enhance the scientific foundations and inform scientific assessments in a way that ensures they are comprehensive, accurate, and relevant for decision-makers.

Proposals should clearly identify the knowledge gap(s) they seek to address, substantiate why recent and ongoing research efforts are unlikely to sufficiently address the issue, explain how the proposed action is expected to contribute to the advancement of Earth system science and identify policy relevance of the research proposed.

International cooperation in the context of WCRP[95] and GCOS[96] is encouraged where relevant.

Proposals indicating use of satellite remote sensing data and derived products are encouraged to collaborate with projects selected under ESA's FutureEO programme and the EC-ESA Earth System Science Initiative (ESSI) to facilitate access to and uptake of satellite data products and related tools or methodologies. They should dedicate resources for collaborative actions.

94 The next frontier for climate change science - Publications Office of the EU
95 https://www.wcrp-climate.org/
96 https://gcos.wmo.int/site/global-climate-observing-system-gcos

HORIZON-CL5-2027-01-D1-07: Advancing understanding, modelling and prediction of extreme events in a changing climate

Call: Cluster 5 Call 01-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 18.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). The Joint Research Centre (JRC) may participate as member of the consortium selected for funding as a beneficiary with zero funding, or as an associated partner. The JRC will not participate in the preparation and submission of the proposal - see General Annex B.
Legal and financial set-up of the Grant Agreements	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) [97].

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

[97] 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

- Improved understanding of past and present extreme events in the context of climate change in Europe and globally, as well as the interaction between different hazards, their cumulative and/or cascading effects.

- Enhanced seamless prediction and projection modelling and attribution capabilities for extreme events and their likelihood to support preparedness, response and resilience to climate change by EU and national and regional actors. The EU Union Preparedness Strategy, the EU Adaptation Strategy and the European Climate Adaptation Plan can act as a guidance in these efforts.

- Up-to-date contributions towards latest climate science, risk assessments, adaptation strategies and policies and improved early warning systems for single and multi-hazard events.

Scope: Climate change is intensifying the frequency and severity of extreme events. Understanding and predicting extreme events and the interaction between different types of hazards is critical to building resilience and safeguarding communities.

Actions are expected to draw upon multiple lines of evidence from a hierarchy of models (including high resolution Earth system models and digital twins) and data of past and recent climate to further our understanding of processes, pre-conditioning and causality driving extreme events under climate change conditions, including anthropogenic factors and internal variability. Other innovative and efficient modelling and analysis methods, including AI-based approaches, to better predict, emulate and reveal climate change related extreme and unprecedented high impact events, and to capture their likelihood are particularly welcome.

Extreme events should be addressed in their broadest sense and types, encompassing isolated, compound or cascading events affecting lives, livelihoods, ecosystems, socio-economic sectors and infrastructures, from large-scale continental to local-scale phenomena.

Actions should encompass quantitative intercomparisons, retrospective analyses, lessons learned and case studies of recent emblematic and diverse extreme events, and demonstrate the corresponding progress offered by the project in terms of improved understanding, comprehensive integration of multiple lines of evidence, and seamless (e.g. from short-term weather to sub seasonal and multi-decadal scales) prediction and projection capabilities and skills.

The work is expected to support the future European Climate Risk Assessments (EUCRA)[98], for example through storylines on extremes or other approaches. Project outcomes should demonstrate clear benefits for the prediction and attribution of extreme events and contribute to the activities of the EU Mission on Adaptation to Climate Change.

Cooperation with global, EU, national and regional actors in the field of Disaster Risk Reduction and climate adaptation, including through integration into or interoperability with Copernicus, Destination Earth and other relevant initiatives is encouraged. In addition,

[98] https://www.eea.europa.eu/en/analysis/publications/european-climate-risk-assessment

international cooperation with the Global South[99] is encouraged in support of climate resilience efforts, especially for capacity building.

This topic is part of a coordination initiative between ESA and the European Commission on Earth System Science (ESSI) under the new Extreme-Events Flagship Cluster. Successful consortia will be asked to coordinate with projects to be selected under ESA's FutureEO programme to facilitate access to and uptake of satellite data products and related tools or methodologies. To this end, proposals should foresee sufficient means for effective coordination (i.e. cluster meetings, joint data management, potential joint actions).

HORIZON-CL5-2027-01-D1-08: Palaeoclimate science for a better understanding of Earth system dynamics

Call: Cluster 5 Call 01-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 14.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Legal and financial set-up of the Grant Agreements	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) [100].

[99] In absence of a single formal definition of the Global South, the list of low- to middle-income countries automatically eligible for Horizon Europe funding should be used for this purpose – see the Horizon Europe List of Participating Countries on EU Funding and Tenders Portal for up-to-date information.

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

- Better process understanding of past climate changes at different time scales, their variability and interactions with ecosystems, leading to improved Earth system models;
- Future climate change scenarios produced in light of past changes in the Earth system, in particular warm climates/high sea-level situations, and abrupt transitions;
- Identification of thresholds in Earth system components and better characterisation of driving mechanisms and feedbacks that may be responsible for non-linear behaviours, including indicators of abrupt changes, and early warning signals within palaeoclimate records;
- Synthesis of climate variations that can serve as fundamental basis for IPCC assessments and benchmarks for model inter-comparisons.

Scope: Palaeoclimatic (including geological, biological and ice-core) records provide information on the long-term evolution of the climate, as well as the conditions and processes that can drive physical and ecological systems during warm and cold periods, deglaciations and abrupt climatic events. The challenge of the research under this topic is to provide robust information on palaeoclimate states and events outside the range of variability recorded over the past centuries that can serve as guide for the development of Earth system models.

This challenge will be tackled through some of the following activities:

- Producing and aggregating in databases high-resolution, well-dated, interoperable palaeoclimatic records on climate variability in terms of amplitude, time (onset, duration, frequency) and space (location, extension), extending the instrumental time series to improve our understating of the proxy records and the quantification of their uncertainties;
- Development of Earth system models with outputs that allow a more direct comparison to palaeo data, modelling climate variability, thresholds, and impacts across timescales from years to millennia;
- Describing short- to long-term climate evolution and the natural climate variability using quantitative reconstructions from different proxies of past climate periods;
- Identification of climate-related (including ecological) tipping points and their consequences using palaeo data and model experiments.
- Allowing for consistent integration of large-scale and more regional/local factors to be reproduced by climate models using natural forcings.

https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf

Projects should rely on palaeoclimatic data from scientific drilling or coring campaigns, sediment records, dendrochronological and other appropriate sources.

Projects funded under this topic are strongly encouraged to collaborate and envisage clustering activities together and with other relevant projects in and outside of Horizon Europe.

HORIZON-CL5-2027-01-D1-09: Assessing the performance of policy instruments to inform climate change mitigation action

Call: Cluster 5 Call 01-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 9.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Legal and financial set-up of the Grant Agreements	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) [101].

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

[101] 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

- Enhanced knowledge of the effectiveness of policy instruments on EU and Member State level to inform mitigation action and policy improvements, ensuring a fair transition and social acceptability;

- Methodologies are developed and improved for ex-ante assessment and ex-post evaluation of greenhouse gas emission reductions from climate policies and measures;

- Strengthened collaboration and established networks between researchers, policy experts and government officials involved in designing and evaluating climate policies on EU and national level.

Scope: As the EU and its Member States intensify efforts to reduce their greenhouse gas (GHG) emissions to achieve climate neutrality by 2050, understanding the effectiveness and acceptability of policy instruments becomes crucial. The implementation of the European Green Deal and climate legislation under the recent "Fit-for-55" package has further emphasised the need to better identify and quantify the impact of climate policies and measures both on EU and national level. Many policies are also subject to fast-changing political dynamics. Ex-post evaluation can help explain whether emission reductions occurred and explain why, while also identifying other benefits or trade-offs of climate mitigation.

By 2023, the EU had achieved a 37% reduction in its GHG emissions compared to 1990 levels[102]. However, even after almost two decades of EU climate policies, there is still limited understanding of the effectiveness of mitigation policies. The increasing complexity of the policy mix makes it difficult to clearly link individual policies or measures to specific emission reductions and other benefits in different sectors. The interaction with other thematic policies such as those on biodiversity, agriculture and trade is therefore also important.

This topic is expected to assess the performance of EU policies and measures for reducing GHG emissions. The focus is on sectors not covered by the current EU Emission Trading System (ETS 1)[103]. This would include gaining insights into factors that influence behavioural change and acceptance of policies, taking into account gender-specific aspects. Actions should consider economic, social, distributional and other effects of mitigation action, including trade-offs and co-benefits such as vis-à-vis climate resilience.

Actions should go beyond traditional decomposition analysis and employ state-of-the-art econometric techniques. They are expected to improve existing methodologies or develop new ones to help distinguish the contribution of GHG emission reductions between policy-driven effects and external drivers. Machine learning and other digital tools and methods could be applied to fill information gaps and gain additional insights.

Actions should assess the impact of national policies on Member State level and how such policies interact with EU-wide policies and measures. They should also identify and highlight examples of national policies and measures that have successfully reduced GHG emissions and brought other environmental, social and economic benefits. Actions are expected to develop,

102 Progress on climate action - European Commission
103 https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/scope-eu-ets_en

test or improve methodologies and tools for ex-ante estimates of GHG emission reductions when designing policies and measures on EU and national level, including integrating climate objectives in other policies. Actions are expected to develop, test or improve methodologies and tools for ex-ante estimates of GHG emission reductions when designing policies and measures on EU and national level, including integrating climate objectives in other policies. This should include economy-wide modelling which takes into account cross-sectoral feedbacks as well as price responsiveness and behavioural change by consumers.

Actions are encouraged to use available datasets on climate mitigation policies and measures, such as the OECD/CAPMF database[104], and the integrated national climate and energy policies and measures datahub hosted by the European Environment Agency (EEA). The use of additional activity data provided by EUROSTAT or national statistical sources may be necessary to provide a comprehensive understanding of policy impacts.

All projects funded under this topic are strongly encouraged to connect, coordinate, and participate in networking and joint activities to foster cross-project cooperation and exchange, particularly to reinforce synergies between methodologies.

This topic requires interdisciplinary collaboration between political scientists, economists and other relevant Social Sciences and Humanities (SSH) disciplines. Actions are also strongly encouraged to include a process of mutual learning and co-creation with stakeholders (e.g., representatives of governments, public administrations, NGOs and academia) to meet end-user needs and support the uptake of results.

HORIZON-CL5-2027-01-D1-10: Understanding and avoiding maladaptation to climate change

Call: Cluster 5 Call 01-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of between EUR 5.00 and 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.
Indicative budget	The total indicative budget for the topic is EUR 18.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of

104 https://www.oecd.org/en/publications/the-climate-actions-and-policies-measurement-framework_2caa60ce-en.html

	Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).

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

- Existing evidence on maladaptation is retrieved comprehensively, and new knowledge is generated for incorporation into main EU repositories, such as Climate-ADAPT or the portal of the EU Mission on Adaptation to Climate Change;
- The risk and adaptation assessment frameworks are improved by better integrating the maladaptation dimension;
- Guidelines and tools for maladaptation prevention and correction strategies are made available to adaptation stakeholders at relevant scales and inform the design and implementation of adaptation strategies and plans of the EU and Member States.

Scope: Recent climate records, showing unprecedented temperatures and extreme weather events, underscore the urgent need for rapid, systemic and comprehensive adaptation to address the escalating impacts of climate change on all natural and managed systems. However, while adaptation is essential, not fully informed measures can backfire, leading to severe unintended consequences or to short-term gains that are not sustainable. In this context, maladaptation refers to adaptation actions unintentionally leading to increased risk of adverse climate-related outcomes, including via increased greenhouse gas emissions, socio-economic, biodiversity and environmental trade-offs, increased or transferred vulnerability and greater social inequity.

Most of the adaptation plans and implemented actions are relatively recent, so even if the cases of maladaptation are increasingly documented, the evidence is still scarce and sparse, as the latest IPCC reports confirm. There is a need to learn from the increasing evidence of maladaptation across sectors and regions, both in Europe and globally, to prevent maladaptation in policy design and implementation (e.g. of the EU Adaptation Strategy).

Actions should address all the following aspects:

- Advance the understanding and identification of drivers that lead to maladaptation for a wide range of systems, socio-economic and environmental conditions. The analysis should be comprehensive and consider an integrated and systemic approach (including insights from Social Sciences and Humanities (SSH) to maladaptation causes and drivers of very diverse nature, such as trade-offs and feedbacks with other priorities and sectors, poor decision making and implementation practices and the inherent uncertainty and other features of the adaptation process). The analysis should also integrate the perspectives of public and private stakeholders and end-users, and include gender disaggregated data.
- Map and analyse evidence to identify and validate effective adaptation practices that prevent maladaptation and help to identify maladaptive ones. Case studies should be used for this purpose, for monitoring and evaluation of the adaptation measures, policies, and actions at a local, regional, and national scale, and from regions and sectors with diverse

characteristics and environmental conditions. Engagement of end-users is encouraged to ensure robust and realistic characterisation of maladaptation experiences. Among other sources, integrating evidence from and for the EU Mission on Adaptation to Climate Change is encouraged. Evidence and insights gained should be systematized and incorporated into main EU repositories.

- Strengthen the methodological and analytical toolbox for complex climate risk and adaptation assessments to increase public understanding and policy awareness of maladaptation risks, and to advance both qualitative and quantitative understanding of the most important complex risk feedbacks, particularly when they may result in significant constraints on options for climate action.

- Study and propose corrective responses for the identified maladaptation cases and provide systematised prevention guidelines and best practice examples to avoid maladaptive outcomes.

Coordination and collaboration with most relevant on-going projects from Mission Adaptation and Cluster 5 Destination “Climate Science and Responses" is encouraged, especially for evidence retrieval, national scale assessment and methodological consistency. Specific resources should be devoted to this purpose and project scientific boards should cross-fertilised. Actions’ results should also contribute to future European Climate Risk Assessments.

HORIZON-CL5-2027-01-D1-11: Africa-EU CO-FUND action on climate

Call: Cluster 5 Call 01-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 15.00 million.
Type of Action	Programme Co-fund Action
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).

	The following additional eligibility criteria apply: At least 30% of the beneficiaries must be legal entities established in the Africa Union member states[105].
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: The funding rate is up to 50% of the eligible costs. Part of the EU funding could also exceptionally be dedicated to fund legal entities established in the African Union members states[106] not participating to the co-fund action as funders in order to enlarge the coverage and impact in the African Union.

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

- A long-term collaboration on climate change research between the EU and the African Union is established through development and implementation of the Climate Action pillar of the EU-AU Research and Innovation Partnership on Climate Change and Sustainable Energy (CCSE),[107] in co-design between African and European partners;
- Reduced fragmentation by aligning the EU, national and multilateral R&I efforts with increased leverage and impact of funding;
- African scientific, policy and practice communities have knowledge and tools to better understand, withstand and adapt to the accelerating effects of climate change, fostering science-based implementation of the Paris Agreement, the Sendai Framework for Disaster Risk Reduction, the Nairobi Declaration on Climate Change, the international dimensions of the EU Adaptation and Preparedness Union Strategy, and the Team Europe Initiative on Adaptation and Resilience in Africa[108];
- African science is better accounted for and African scientists are better represented in international fora such as IPCC and UNFCCC.

Scope: The European Commission Political Guidelines 2024-2029[109] call for new impetus in EU partnership with Africa to jointly address Africa's concerns which include increasing impacts of climate change. This requires stepping up research and innovation cooperation between Europe and Africa in this crucial domain for securing Africa's prosperity and resilience, which also aligns with Europe's interests. With disproportionate burden from climate

105 "African Union member states" excludes countries whose membership has been temporarily suspended.
106 "African Union member states" excludes countries whose membership has been temporarily suspended.
107 https://research-and-innovation.ec.europa.eu/strategy/strategy-research-and-innovation/europe-world/international-cooperation/regional-dialogues-and-international-organisations/eu-africa-cooperation/partnership-climate-change-and-sustainable-energy-ccse_en
108 Climate Change Adaptation & Resilience - Africa | Capacity4dev
109 https://commission.europa.eu/document/download/e6cd4328-673c-4e7a-8683-f63ffb2cf648_en

change risks, high vulnerability and low adaptive capacity, Africa faces unique challenges that require tailored, context-specific solutions.

The action should establish joint collaborative activities between the EU and the AU, their respective Member States and other like-minded countries implementing the Climate Action Pillar of the CCSE Partnership. For framing its activities, the action should use the CCSE Roadmap[110] and the priorities identified by the Coordination and Support Action funded from the call "HORIZON-CL5-2025-03-D1-07: Implementing the climate action pillar of the EU-African Union Partnership on Climate Change and Sustainable Energy". It should also consider the latest scientific and policy developments for adjusting the course of its activities. The action should address a well-balanced variety of climate issues under the Climate pillar of the CCSE Partnership, with particular emphasis on climate risk reduction and resilience. It should advance availability of climate-related data, data sharing and related information platforms, enhance climate services, and promote an integrated approach to knowledge. This should include awareness raising – in particular for the most vulnerable sectors and parts of the population – while leveraging the opportunities offered by the digital revolution to improve accessibility and impact. Co-design, co-development, and demonstration with end-users should be an integral part of the activities to increase uptake of the outcomes.

The action should organise joint calls and allow sufficient time for the implementation of the co-funded projects. The estimated duration of the action in order to achieve the establishment of the long term, sustainable collaboration is 5-6 years. Up to one third of the EU funding could exceptionally be dedicated to fund African partners from countries not participating to the co-fund action to enlarge the coverage and impact in Africa.

As a horizontal requirement, the action should promote collaborations between government, research and academia, private sector, and civil society, including for the sake of valorisation of results from the funded and other relevant activities. It should also prioritise capacity building among African scientists, practitioners and other stakeholders, including development of skills and researcher exchange.

Inclusiveness of a broad range of EU Member States/Horizon Europe Associated Countries and African partners is expected.

Beyond implementing transnational calls, the action should also design and carry out an ambitious programme of coordination and clustering activities to seek synergies, align efforts, exchange results, and organise joint activities with other relevant Horizon Europe, and other EU, national and multilateral initiatives[111]. It should provide support to the operation of the CCSE partnership and promoting its activities on international stage to increase the visibility of EU science diplomacy actions in Africa for climate-resilient development.

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110 https://research-and-innovation.ec.europa.eu/document/download/bb5227b4-5573-4078-bf70-2b668f8a573e_en?filename=ccse_roadmap_2017.pdf

111 Such as PRIMA, FNSSA, CS4RRA, ClimSA, Regional Centers of Excellence related to the green transition, or climate related components of the Africa-EU Space Programme

It is recommended that the action draws on the experience and lessons learnt from the implementation of the energy pillar of the CCSE Partnership[112].

HORIZON-CL5-2027-01-D1-12: Better understanding and attribution of land and ocean carbon sources and sinks

Call: Cluster 5 Call 01-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 25.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). The Joint Research Centre (JRC) may participate as member of the consortium selected for funding as a beneficiary with zero funding, or as an associated partner. The JRC will not participate in the preparation and submission of the proposal - see General Annex B.
Procedure	The procedure is described in General Annex F. The following exceptions apply: To ensure a balanced portfolio covering different research areas (A, B and C), grants will be awarded to applications not only in order of ranking, but also to at least two highest ranked applications in each of areas A and B and at least one in Area C, provided that the corresponding applications attain all thresholds.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: 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

[112] https://cordis.europa.eu/project/id/963530andhttps://cordis.europa.eu/project/id/101172838

	documentation, availability of model code and input data developed under the action. 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) [113].

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

- Better understanding of oceanic carbon sources and sinks, their drivers and dynamics under different climate scenarios, including their responses to human interventions;
- Better understanding of land ecosystem carbon sources and sinks, their drivers (both natural and anthropogenic) and their evolution under future climate and land-based mitigation scenarios;
- Progress on reconciling estimates of anthropogenic carbon dioxide emissions and removals from land originating from the climate science and national emissions reporting communities;
- More consistent representation and quantification of lateral transfers of carbon.

Scope: Understanding the mechanisms and drivers of land (including inland waters) and ocean carbon sinks and sources is crucial for accurate climate models and scenarios and informing climate mitigation strategies. However, significant gaps and uncertainties remain in quantifying these complex processes and their components. It is essential to better understand the roles of anthropogenic and natural drivers of carbon fluxes, in particular the surface-to-air flux. This is necessary for reconciling conceptual discrepancies among estimates and assessing the implications for future trends and mitigation potential, taking into account that mitigation actions need to be additional to natural processes and business-as-usual and that the remaining carbon budget depends, inter alia, on assumptions on sinks.

Projects are expected to address one of the three areas identified below, while considering collaboration with JRC (Joint Research Centre) and ensuring coordination and cooperation across projects to address consistency in key factors, such as data, scenarios and models used or the representation of lateral transport of carbon (e.g., through river transport or harvest). This topic is part of a coordination initiative between ESA and the European Commission on Earth System Science (ESSI) under the Carbon Cluster. Successful consortia will be asked to

[113] 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

coordinate with projects that will be selected under ESA's FutureEO programme to facilitate access to and uptake of satellite data products and related tools or methodologies. To this end, proposals should foresee sufficient means for effective coordination (i.e. cluster meetings, joint data management, potential joint actions.

Area A: Oceanic carbon sources and sinks

The ocean's capacity to act as a carbon sink is determined by a variety of factors, including changes in climate, atmospheric composition (in particular CO_2 concentration) and chemical, physical and biological processes of the ocean, all influenced by human activities. Projects are expected to improve the understanding and quantification of the various mechanisms involved, with a focus on the behaviour of the ocean sink under past (including palaeo records), present and future conditions and various climate change and emission scenarios. The projects should contribute to a better understanding of the biophysical potential for marine mitigation approaches (in particular carbon dioxide removal) and their implications over relevant timeframes, including feedbacks. The analysis should also include responses to ambitious mitigation (e.g., atmospheric stabilisation in line with policy objectives). Projects should build on the results of related earlier projects, in particular those under call HORIZON-CL6-2022-CLIMATE-01-02.

Area B: Land carbon sources and sinks

Currently, land ecosystems globally represent a significant net carbon sink, driven by natural processes greatly perturbed by a variety of human influences, including past and present land management practices, increasing atmospheric CO_2 concentrations, nitrogen deposition and climate change itself. They are also a significant source of anthropogenic greenhouse gas emissions. Natural responses to environmental change and management effects overlap and interact in space and time, making the isolation of different factors (natural and anthropogenic) challenging or even impossible. Projects will aim to further our understanding of the key factors that have driven land carbon fluxes in the past and improving their quantification under present conditions and facilitating their projection under relevant climate and land use scenarios.

Area C: Reconciliation of different land use emission estimates

The climate science and national emissions reporting communities have historically used different interpretations of anthropogenic land-based carbon dioxide emissions and removals, leading to varying estimates with significant policy implications for assessing climate progress. It is crucial to reconcile these definitions with due consideration for lateral transfers of carbon to ensure comparability across global, regional, and national scales, to foster integration between different expert communities and approaches and to support policy negotiations and decision-making approaches. Through innovative approaches, the projects should enhance confidence in land-use CO_2 flux estimates and enable more accurate assessments of national and collective climate progress, as well as alternative land-based policy options.

HORIZON-CL5-2027-01-D1-13: Next generation scenarios for informing climate and sustainability transitions

Call: Cluster 5 Call 01-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 24.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). The following additional eligibility criteria apply: The consortium must include as beneficiary at least three independent legal entities established in three different Global South countries[114] The Joint Research Centre (JRC) may participate as member of the consortium selected for funding as a beneficiary with zero funding, or as an associated partner. The JRC will not participate in the preparation and submission of the proposal - see General Annex B.
Procedure	The procedure is described in General Annex F. The following exceptions apply: To ensure a balanced portfolio covering different research areas (A, B and C), grants will be awarded to applications not only in order of ranking but also to at least two highest ranked applications in each area, provided that the corresponding applications attain all thresholds.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: 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

[114] In absence of a single formal definition of the Global South, the list of low- to middle-income countries automatically eligible for Horizon Europe funding should be used for this purpose – see the Horizon Europe List of Participating Countries on EU Funding and Tenders Portal for up-to-date information.

	the use of EU funding under the action must be ensured through documentation, availability of model code and input data developed under the action. 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) [115].

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

- Strengthened collaboration and integration across research communities, better capturing interactions and trade-offs between climate and non-climate objectives, such as biodiversity or pollution related. This will support more comprehensive and consistent evaluations, benefiting key global assessments (IPCC, IPBES) and improving their impact on European and global policies (European Green Deal, UNFCCC, CBD);

- More relevant, robust and actionable scenarios that inform optimal policy interventions, serving the needs and supporting decision-making of diverse end-users at various spatial scales, from policymakers and planning authorities to businesses and civil society;

- More globally representative, diverse, inclusive, transparent, widely accepted and better communicated scenarios that support climate-resilient development pathways and foster global consensus on climate action.

Scope: Climate scenarios have been instrumental in shaping global, national, and increasingly local responses to climate change by helping stakeholders make informed decisions. Against the backdrop of rapid environmental shifts, social upheavals, high uncertainties and complexity, scenarios must be advanced to inform low-emission climate-resilient pathways, while also accounting for other critical policy priorities, such as environmental protection.

Actions should improve Integrated Assessment Models (IAMs) or propose alternative approaches to address key challenges and gaps in current climate scenario frameworks. They should extend the scope of scenarios beyond the 21st century, enlarge the future possibility space with more diverse narratives and drivers (e.g. post-growth), more explicit consideration of equity, justice, geopolitics and attention to inclusivity.

Actions should focus on one of the following research areas:

[115] 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

Area A: Integration of climate impacts and adaptation dimension

Develop approaches to better integrate physical climate impacts, adaptation, its costs and limits into mitigation pathways. This includes exploring how climate impacts including extremes and biophysical feedbacks affect mitigation strategies, testing the resilience of low-emission pathways to climate impacts, and how adaptation interacts with mitigation.

Area B: Improved scenario frameworks

Update baseline scenarios and expand scenario narratives to better address multi-scale, cross-sectoral issues and the needs of downstream assessments. Scenarios should capture a wider range of plausible futures to reflect changing socio-economic and environmental conditions (including a broader range of economic growth assumptions), technological advancements, evolving policy landscape and disruptive events. This includes extension of Shared Socioeconomic Pathways (SSP) and Representative Concentration Pathways (RCP) scenario framework, or development of alternatives, to enhance regional and local applicability, to support adaptation pathway development, and to improve relevance beyond the climate research community - notably for biodiversity and SDGs.

Area C: Improved policy representation

Enhance the granularity and diversity of policy (both mitigation and adaptation) representation in scenarios with more focus on implementation aspects to bridge the gap between modelled pathways and real-world action. Address social, geopolitical, economic and technological factors, considering interactions between industrial, trade, climate and other environmental policies. Examine implications for competitiveness, employment, investment flows, energy security, supply chain resilience, technological innovation, international spillovers, as well as well-being. Investigate implementation and impact of recent commitments and initiatives (e.g. fossil fuel phase-out, Global Methane Pledge) and the impact of rising geopolitical tensions on their implementation, and mitigation action overall.

Actions should promote transdisciplinary collaboration and co-design with stakeholders to integrate diverse perspectives and needs They should develop and test new approaches, including communication, to improve uptake of results by various audiences. The topic therefore requires inclusion of relevant SSH expertise, to produce meaningful and significant effects to enhance the societal impact of related research activities.

All projects funded from this topic are strongly encouraged to collaborate and envisage clustering activities together and with other relevant projects in and outside of Horizon Europe. They should contribute to the organisation of the European Climate and Energy Modelling Platform [116] conferences to foster dialogue between scientists, policymakers and other stakeholders. They should also support inclusive and transparent model intercomparison exercises, aligning with the efforts of the European Climate and Energy Modelling Forum[117].

116 https://www.ecemf.eu/ecemp/european-climate-and-energy-modelling-platform/
117 https://www.ecemf.eu/

International cooperation is encouraged in general and required with the Global South, to ensure diverse, globally representative scenario space and foster capacity development.

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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*".

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

Batteries

1. Increased **competitiveness and strategic autonomy** of a complete EU value chain while maximizing sustainability.
2. **Reducing dependency on raw materials** and upscaling processing capacity, also for recycled materials.
3. Creating an integrated European battery sector for **next generation batteries**, from design to manufacturing and all the way to end of life, reducing environmental impact.
4. **Improving energy storage technologies** to enhance the resilience of EU's energy system, facilitating integration of renewable energy sources.

Batteries

Proposals are invited against the following topic(s):

HORIZON-CL5-2026-09-D2-01: Producing battery-grade materials for electrodes through sustainable processing and refining of raw materials or developing bio-based materials (BATT4EU Partnership)

Call: Cluster 5 Call 09-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 7.16 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 28.64 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply:

	If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 4-5 by the end of the project – see General Annex B. Activities may start at any TRL.
Procedure	The procedure is described in General Annex F. The following exceptions apply: In order to ensure a balanced portfolio of activities covering both categories of materials, 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.
Legal and financial set-up of the Grant Agreements	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) [118].

Expected Outcome: Proposals are expected to contribute to all following points:

- Significantly reduced EU dependency on imported battery-grade raw materials, specifically emerging technologies and carbon-based electrode materials.
- Established European value chains for next-generation battery materials, enhancing the EU's technological leadership and strategic autonomy.

Scope: Proposals under this topic are expected to address all aspects for one of the following categories:

1. Sustainable Processing and Refining of next generation batteries-grade Material, delivering all of the following:

[118] 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

- Development and validation of innovative, environmentally friendly refining technologies for producing battery-grade metals and materials suitable for next-generation battery chemistries. This covers raw and advanced electrode materials for the components of sodium-ion batteries or beyond generation 3[119] lithium-ion batteries

- Development of processes achieving significant reductions in carbon and ecological footprint, energy usage, and chemical inputs. The selected processes should not negatively impact any of the aspects above or cause significant harm.

- Validation of economic viability, environmental sustainability, and technological robustness of the proposed refining and processing solutions.

OR:

2. Utilising Bio-based Raw Materials for Battery Electrode Materials delivering on all of the following:

- Development of synthetic graphite and/or alternative carbonous materials for battery components derived from bio-based European feedstocks (e.g., biomass, agricultural residues, lignocellulosic materials). Inactive components such as binders may also be included.

- Comprehensive characterization and validation of developed electrode materials in sodium-ion and lithium-ion battery cells, demonstrating comparable or superior performance to conventional graphite electrodes, specifically targeting cycle stability, energy density, and charge/discharge rates.

- Demonstration of credible pathways for pilot-scale production pathways for bio-based electrode materials including a clear techno-economic analysis and LCA/LCC impact assessment.

The Commission initiative for Safe and Sustainable by Design[120] (SSbD) sets a framework for assessing the safety and sustainability of chemicals and materials which should be considered as a reference for project proposals.

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-CL5-2026-03-D2-02: Development of direct recycling processes (BATT4EU Partnership)

Call: Cluster 5 Call 03-2026 (WP2026-2027)

119 https://bepassociation.eu/wp-content/uploads/2021/09/BATT4EU_reportA4_SRIA_V15_September.pdf

120 https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/key-enabling-technologies/chemicals-and-advanced-materials_en

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 4.77 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 14.32 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). The Joint Research Centre (JRC) may participate as member of the consortium selected for funding as a beneficiary with zero funding, or as an associated partner. The JRC will not participate in the preparation and submission of the proposal - see General Annex B.
Technology Readiness Level	Activities are expected to achieve TRL 5 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [121].

Expected Outcome: Proposals are expected to contribute to all following points:

- Significantly improved recycling efficiency for various battery chemistries, including those with low intrinsic metal values (e.g., LFP, LMFP, sodium-ion).
- Reduced energy consumption of recycling processes compared to conventional recycling methods

[121] 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

- Substantial decreases in Europe's dependency on raw material imports
- Demonstrated economic viability and competitive cost structures for direct recycling technologies, enhancing circular economy practices in European battery cell manufacturing.
- Scalable and automated recycling processes suitable for handling high volumes of gigafactory production scrap, directly reintegrating recycled materials into battery manufacturing processes.

Scope: Proposals under this topic are expected to focus explicitly on the development, validation, and upscaling of direct recycling technologies targeting next-generation and low-value battery chemistries (notably LFP, LMFP, and sodium-ion), as well as efficiently managing gigafactory production scrap.

Projects are expected to address all the following points:

- Direct recycling processes, validated at relevant environment[122] and capable of selectively recovering high-purity active materials from battery electrodes, minimizing processing steps, and preserving material functionality.
- Specific optimization of recycling routes for economically challenging battery chemistries, achieving recovery efficiencies beyond the state-of-the-art
- Innovative approaches for process automation, including intelligent sorting and robotic handling systems, tailored for gigafactory scrap streams, with demonstrated potential to seamlessly integrate into industrial-scale manufacturing facilities.
- Formulation of practical design recommendations based on project findings, to facilitate and optimize direct recycling processes through improved cell design.
- Robust techno-economic analyses demonstrating clear competitive advantages over traditional recycling pathways, complemented by comprehensive life-cycle assessments (LCA) highlighting sustainability benefits in terms of energy savings, CO_2 emission reduction, biodiversity and ecosystems impact, and overall resource efficiency.

The Commission initiative for Safe and Sustainable by Design[123] (SSbD) sets a framework for assessing the safety and sustainability of chemicals and materials which should be considered as a reference for project proposals.

Proposals could consider the involvement of the European Commission's Joint Research Centre (JRC)[124] whose contribution could consist of providing added value regarding various aspects of battery circularity and sustainability. For further information on the JRC's possible

122 In line with TRL 5, see General Annex B.
123 https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/key-enabling-technologies/chemicals-and-advanced-materials_en
124 https://joint-research-centre.ec.europa.eu/laboratories-z/battery-energy-storage-testing_en

contribution to the projects, please, search for additional publicly available information on the JRC's website[125] (EU Science Hub) on the NCP portal, or request specific information from the JRC (JRC-NCP-Network@ec.europa.eu)

JRC will 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-CL5-2026-10-D2-03: Integrated Production and Product Development for Next-Generation Lithium-based Batteries for Mobility (BATT4EU and Made in Europe Partnerships)

Call: Cluster 5 Call 10-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 33.63 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 100.91 million.
Type of Action	Innovation Actions
Admissibility conditions	The conditions are described in General Annex A. The following exceptions apply: Due to the complexity of the topic, the page limit for proposals is increased to 60 pages.
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). The Joint Research Centre (JRC) may participate as member of the consortium selected for funding as a beneficiary with zero funding, or as an associated partner. The JRC will not participate in the preparation and submission of the proposal - see General Annex B.

125 JRC NCP | Horizon Europe NCP Portal

Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B.
Procedure	The procedure is described in General Annex F. The following exceptions apply: To ensure a balanced portfolio covering different sectors, 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 automotive sector and one proposal that is the highest ranked within the aviation sector, provided that the proposals attain all thresholds.

Expected Outcome: Proposals are expected to contribute to all following points:

- The projects must fulfil the performance targets, at the cell and system level, corresponding to the specific targeted application, to be specified in the proposal. Appropriate KPI must be defined for the energy density (volumetric and gravimetric), Power density and C-rate, number of cycles and cost defined under operational conditions.
- Boost EU competitiveness in next-generation battery technologies for mobility applications.
- Develop pilot manufacturing capability for next generation lithium-based batteries.
- Strengthen the EU battery value chain, including new manufacturing equipment, automation, and scalable production processes.
- Advance the understanding of next-generation battery interfaces at an industrial scale, ensuring manufacturability, durability, and cost-effectiveness.
- In the case of aviation, the battery requirements should be compatible at minimum with EASA CS.23 (level 4), CS.27 and preferably with CS.25 categories.

Scope: This topic will support the scaling-up of next generation (i.e., beyond generation 3) lithium-based batteries (e.g., semi and all-solid state, generation5) from cell prototypes (TRL 4-5) to demonstration of scalable production and demonstration of cell integration into module/pack level. The projects will cover pilot production, process automation, system integration and demonstration, advanced cell design, and supply chain development to ensure that Europe remains at the forefront of battery innovation.

The projects must address the needs of a single specific and strategically relevant transport mode, and the targeted mode must be clearly indicated in the proposal. The following transport modes are in scope: Automotive; Aviation; Rail; Waterborne.

The projects are expected to cover all of the following production targets:

- Upscaling of components production Technologies:

  - Optimisation and pilot-scale integration methods of anode and cathode materials compatible with next generation electrolytes

- Development of Cell Concepts, Manufacturing Equipment and Machinery
  - Development of flexible and high-throughput processing methods for large-scale cell production (e.g., laser patterning, vacuum sintering, and advanced calendaring).
  - Development of next-generation production machinery, tailored for next generation lithium-ion cell manufacturing (e.g., solid electrolyte deposition tools, high-precision stacking machines).

- Design and demonstration of module and packs into vehicles/relevant environment
  - Develop module/pack design and relevant sensors and Battery Management Systems (BMS), optimised for supporting the system, for seamless cell-to-system integration, regulatory compliance, and specific end-user application requirements.
  - Perform comprehensive validation, including performance, durability, and safety testing under realistic operational conditions, addressing thermal management, mechanical stress, vibration resistance, and electrical performance at relevant scales.

The Commission initiative for Safe and Sustainable by Design[126] (SSbD) sets a framework for assessing the safety and sustainability of chemicals and materials which should be considered as a reference for project proposals.

Whenever the expected exploitation of project results entails developing, creating, manufacturing and marketing a product or process, or in creating and providing a service, the plan for the exploitation and dissemination of results must include a strategy for such exploitation. 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)[127] whose contribution could consist of performing experimental or desk-top research on battery performance 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[128] (EU Science Hub) on the NCP portal, or request specific information from the JRC (JRC-NCP-Network@ec.europa.eu)

JRC will 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).

126 https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/key-enabling-technologies/chemicals-and-advanced-materials_en
127 https://joint-research-centre.ec.europa.eu/laboratories-z/battery-energy-storage-testing_en
128 JRC NCP | Horizon Europe NCP Portal

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

This topic contributes to the industrial action plan for the automotive sector.

HORIZON-CL5-2026-09-D2-04: Coordinated topic with India on recycling of EV batteries

Call: Cluster 5 Call 09-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 9.55 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 9.55 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). The following additional eligibility criteria apply: The project must include at least one work package for coordinated activities with the linked project awarded by the Ministry of Heavy Industry of the Government of India (MHI). Participation of legal entities established in India, which is a third country under Horizon Europe, is only possible as associated partners.
Technology Readiness Level	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Grants awarded under this topic will be linked to the coordinated project funded by the Ministry of Heavy Industries (MHI), Government of India.

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Expected Outcome: Battery recycling is of strategic importance for both Europe and India, not only to keep raw materials in the respective territories but also to reduce the environmental impact of the recycling process. R&I in this area has been identified as a priority by the EU-India Trade and Technology Council's Working Group on Green and Clean Energy Technology to reinforce bilateral cooperation.

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

- Battery recyclers based in the EU and India benefit from of the improved sustainability, safety, and affordability of innovative recycling processes.
- Stakeholders on battery recycling based in the EU and India benefit from each other's experience on recycling logistics, including the informal processes and supply chain constraints.
- The cooperation between EU and India key researchers, institutions and industries which are active in battery recycling is supported and strengthened.

Scope: Projects are expected to build a jointly operated recycling pilot line on Indian soil demonstrating innovative recycling processes for lithium-ion batteries going beyond the current state of the art in terms of recycling efficiency (in particular of Li), environmental impact, cost, and compatibility with different types of batteries (including those currently on the market and to be anticipated in the coming years). The pilot line must be able to process black mass including mixed chemistries with Li as end product, with a purity level suitable for Cathode Active Material (CAM). Recovery of graphite or silicon/graphite in various compositions should also be addressed. Adequate benchmarking figures must be provided to show progress beyond the state of the art.

Projects are also expected to demonstrate effective use of technologies for logistics, sorting, collection and discharging of end-of-life batteries. This should involve the informal sector (i.e. end users, collection points, sales channels) and include the following two areas:

- Development of innovative and digitalised waste collection systems towards zero-risk to improve quantity, quality, safety of the stored End of Life batteries
- Safe, fast, cost-efficient ways for large-scale discharging/deactivation End of Life batteries (both damaged and scraps), anticipating the development for new chemistries.

Projects are furthermore expected to assess the environmental impact of the piloted innovations in the recycling processes through Life Cycle Analysis.

Projects to be aligned with the missions, policies and priorities in the area of battery recycling, in both the regions (India and the EU). On the Indian side, alignment with relevant regulatory and strategic frameworks is expected, such as the Battery Waste Management Rules (2022) and the National Programme on Advanced Chemistry Cell (ACC) Battery Storage. EU projects are expected to build upon the activities of past and ongoing recycling-related projects under the BATT4EU partnership, as well as progress being made on the implementation of the Battery

Passport. Projects are furthermore expected to be in line with the Batteries Regulation[129] (in particular with sections referring to recycling efficiency) and the Safe and Sustainable by Design guidelines[130].

The exploitation of results, including IPR, should be appropriately addressed in the proposal.

Joint work should benefit from the Indian and European experience in battery recycling. Aligned projects should have the same start date, the same duration, same targets, and must show clearly how the coordination among them will bring added scientific value. To ensure a project implementation that reflects a genuine EU-Indian cooperation, aligned projects should involve properly coordinated research activities between EU and India in the jointly developed research plan of the two coordinated projects. Independent projects, which are not aligned, will be considered ineligible. Proposals will include detailed explanations about tasks and effort of the coordinated proposal as a whole and cross-references to the other part of the proposal.

The coordinated call aims at exploiting synergies between India and Europe in terms of scientific expertise and resources in topics related to battery recycling by implementing coordinated projects. Potential areas for collaboration (i.e. the coordinated part of the call) could include (but are not limited to) demonstration of more flexible and adaptable recycling processes capable of treating mixed battery chemistries; innovative & digitalised waste collection systems; advanced sorting systems; active monitoring systems for high level of safety; safe, fast and cost-efficient discharging/deactivation (gen4 included); prediction for second-life use of batteries, diagnostics incl State of Health.

The topic is within the scope of the EU-India Strategic Partnership and the EU-India Trade and Technology Council in relation to battery recycling technologies. For the purposes of this topic, the Ministry of Heavy Industries (MHI), Government of India has made the required funding available for the coordinated projects of the Indian side. A balanced effort and matched budget between Europe and India regarding the two coordinated calls are expected.

HORIZON-CL5-2027-02-D2-05: Improvement of Adaptability, Flexibility and Efficiency of Existing Recycling Processes (BATT4EU Partnership)

Call: Cluster 5 Call 02-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 9.55 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 19.09 million.

129 Regulation - 2023/1542 - EN - EUR-Lex

130 https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/recommendation-safe-and-sustainable-chemicals-published-2022-12-08_en

Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). The Joint Research Centre (JRC) may participate as member of the consortium selected for funding as a beneficiary with zero funding, or as an associated partner. The JRC will not participate in the preparation and submission of the proposal - see General Annex B.
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B. Activities may start at any TRL.

Expected Outcome: Proposals are expected to contribute to all following points:

- Improving cost and recovery efficiency of existing scaled recycling technologies
- Demonstrated technological solutions capable of efficiently recycling diverse feedstocks, including production scrap, and mixed lithium-ion battery chemistries
- Improved European competitiveness by reducing EU dependence on imported raw materials through improved recycling processes
- Demonstrable compliance with the targets and requirements set by the EU Batteries Regulation, including recycling efficiency and material recovery rates.

Scope: Proposals under this topic are expected to specifically address innovation actions that enhance the adaptability, flexibility, and operational efficiency of existing battery recycling processes.

Projects are expected to explicitly target improvements for processing mixed input streams, particularly production scrap and various lithium-ion battery chemistries

Proposals are expected to clearly demonstrate technical innovations in black mass processing, resulting in the efficient recovery of high-purity battery-grade materials suitable for reintroduction into the European battery manufacturing value chain.

Proposals are expected to address all of the following points:

- Development and demonstration of recycling technologies capable of handling variable composition feedstocks, potentially within the same batch.

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- Optimization of hydrometallurgical and/or pyrometallurgical processes for enhanced recovery rates of critical raw metals, aiming to at least achieve recovery efficiencies requirements set by the EU Batteries Regulation

- Detailed techno-economic assessments (TEA) and comprehensive life-cycle assessments (LCA), demonstrating significant improvements in energy efficiency, CO2 and ecological footprint reduction, and economic viability.

Where required, proposals should include robust and digitalised sorting technologies and other advanced pre-treatment technologies.

The Commission initiative for Safe and Sustainable by Design[131] (SSbD) sets a framework for assessing the safety and sustainability of chemicals and materials which should be considered as a reference for project proposals.

Whenever the expected exploitation of project results entails developing, creating, manufacturing and marketing a product or process, or in creating and providing a service, the plan for the exploitation and dissemination of results must include a strategy for such exploitation. 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)[132] whose contribution could consist of providing added-value regarding various aspects of battery circularity and sustainability. For further information on the JRC's possible contribution to the projects, please, search for additional publicly available information on the JRC's website[133] (EU Science Hub) on the NCP portal, or request specific information from the JRC (JRC-NCP-Network@ec.europa.eu)

JRC will 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-CL5-2027-02-D2-06: Sustainable and Competitive Cell Production Techniques for Lithium-ion And Sodium-ion Batteries (BATT4EU Partnership)

Call: Cluster 5 Call 02-2027 (WP2026-2027)
Specific conditions

131 https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/key-enabling-technologies/chemicals-and-advanced-materials_en
132 https://joint-research-centre.ec.europa.eu/laboratories-z/battery-energy-storage-testing_en
133 JRC NCP | Horizon Europe NCP Portal

Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 19.09 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 38.18 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). The Joint Research Centre (JRC) may participate as member of the consortium selected for funding as a beneficiary with zero funding, or as an associated partner. The JRC will not participate in the preparation and submission of the proposal - see General Annex B.
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B. Activities may start at any TRL.

Expected Outcome: Proposals are expected to contribute to all following points:

- Significantly enhanced competitiveness, resilience, and sustainability of the European battery cell manufacturing industry, achieving measurable reductions in capital expenditure (CAPEX), operational expenditure (OPEX), energy consumption, and environmental footprint compared to state-of-the-art processes.
- Demonstrated advanced manufacturing processes and equipment that substantially decrease battery production costs and improve overall production efficiency and battery quality.
- Established flexible and modular pilot production lines capable of efficiently transitioning between various battery chemistries and compositions, with demonstrated reduction in cross-contamination and effective management of sensitive materials.

Scope: Proposals are expected to target the development and demonstration of innovative, next-generation battery cell manufacturing processes and machinery. These solutions are expected to explicitly focus on simultaneously achieving significant cost reductions and considerable decreases in energy consumption over the battery lifecycle, while maintaining or improving battery cell quality and sustainability metrics.

Proposals are expected to address all of the following:

- Demonstration of flexible, modular, and reconfigurable machinery to be integrated in manufacturing pilot lines that effectively accommodate transitions between various lithium-ion chemistries/compositions and sodium-ion chemistries.

- Development and demonstration novel mixing systems and novel electrode manufacturing techniques with advanced inline quality control

- Optimization of dry-room cell assembly processes, including the development and validation of advanced assembly equipment and techniques to significantly increase cell assembly throughput rates, reduce overall energy consumption associated with maintaining dry-room conditions, and enhance environmental controls

- Establishment of rapid and energy-efficient cell formation processes, significantly shortening formation and aging times compared to state of the art and enhancing quality assurance.

- Digitalisation of the production line, including in-line quality testing and identification of defects.

- Inclusion of comprehensive techno-economic assessments (TEA) and life-cycle analyses (LCA) to demonstrate clear environmental, economic, and scalability advantages over existing, state-of-the-art battery cell manufacturing practices.

The Commission initiative for Safe and Sustainable by Design[134] (SSbD) sets a framework for assessing the safety and sustainability of chemicals and materials which should be considered as a reference for project proposals.

Whenever the expected exploitation of project results entails developing, creating, manufacturing and marketing a product or process, or in creating and providing a service, the plan for the exploitation and dissemination of results must include a strategy for such exploitation. 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)[135] whose contribution could consist of performing experimental or desk-top research on battery performance 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[136] (EU Science Hub) on the NCP portal, or request specific information from the JRC (JRC-NCP-Network@ec.europa.eu)

134 https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/key-enabling-technologies/chemicals-and-advanced-materials_en
135 https://joint-research-centre.ec.europa.eu/laboratories-z/battery-energy-storage-testing_en
136 JRC NCP | Horizon Europe NCP Portal

JRC will 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-CL5-2027-04-Two-Stage-D2-07: Novel approaches towards next-generation battery concepts, leveraging the enabling role of innovative advanced materials (BATT4EU and IAM4EU Partnerships)

Call: Cluster 5 Call 04-2027 (2-stage) (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 4.82 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 48.18 million.
Type of Action	Research and Innovation Actions
Admissibility conditions	The conditions are described in General Annex A. The following exceptions apply: Applicants submitting a proposal for a blind evaluation (see General Annex F) must not disclose their organisation names, acronyms, logos nor names of personnel in the proposal abstract and Part B of their first-stage application (see General Annex E).
Eligibility conditions	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 as a beneficiary with zero funding, or as an associated partner. The JRC will not participate in the preparation and submission of the proposal - see General Annex B. If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 4-5 by the end of the project – see General Annex B. Activities may start at any TRL.

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Procedure	The procedure is described in General Annex F. The following exceptions apply: The first-stage proposals of this topic will be evaluated blindly. To ensure a balanced portfolio covering different sectors, 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 each of the three areas, provided that the proposals attain all thresholds.
Legal and financial set-up of the Grant Agreements	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) [137].

Expected Outcome: Proposals are expected to contribute to the generation of innovative battery concepts to safeguard future European competitiveness through innovative battery advanced materials and technologies contributing to green energy usage through enhanced energy storage and management capabilities.

Depending on the areas listed in the scope, proposals are expected to cover all the respective bullet points:

Area A: Development and validation of low-cost battery chemistries particularly suited for electric mobility supporting a reliable and flexible energy flow to meet fluctuating demand by enabling better integration of diverse energy sources:

- Proposals are expected to provide the state-of-the-art benchmark for the performance of Design-to-Performance lithium-ion batteries[138] and sodium-ion batteries and compare the project's improvements of performance targets to said benchmark.
- Main component (active and main inactive materials) cost of below €35 per kWh

OR

Area B: Development of high-performance battery, particularly suited for aviation and high-performance mobility boosting green energy adoption by leveraging advanced energy carriers and storage solutions to support demanding applications:

[137] 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

[138] https://bepassociation.eu/our-work/sria/

- Validation of advanced battery concepts achieving energy density exceeding 500 Wh/kg and/or Power density exceeding the state-of-the-art benchmark based on the selected application(s).

OR

Area C: Development of durable and reliable battery advanced materials and cell-level concepts specifically suited to stationary storage for either grid and/or energy-intensive industry applications.

Scope: Projects are expected to contribute to one of the following battery concepts that meet different end-user needs and applications, going beyond state-of-the-art:

Area A: Low-cost batteries designed primarily for passenger electric vehicles and/or stationary storage:

- Development of battery chemistries utilizing minimised amount of Critical Raw Materials
- Cost reduction through use of smart functionalities, as well as lightweight, functionalised and/or simplified casing or cooling concepts etc is encouraged.

OR

Area B: High-performance battery chemistries intended for applications requiring superior energy density, power density, and safety standards, such as aviation and maritime sectors:

- Innovative approaches to battery structural integration and multifunctional materials to significantly boost gravimetric and volumetric performance.

OR

Area C: Novel battery advanced materials and cell-level concepts, for stationary energy storage for grid storage and/or energy-intensive industrial applications:

- If applied for grid storage, solutions should demonstrate potential for cost-effective integration at system level (targeting system-level cost below €50/kWh) and provide support for multi-hour storage durations to enhance renewable energy uptake and grid flexibility.
- If applied for energy-intensive industrial applications, battery materials and designs should address continuous high-load operation, cycling under harsh conditions, and reliability over long operational periods, contributing to the electrification and decarbonisation of specific industrial processes under study.

All projects are expected to provide an assessment on all following aspects:

- Scalability potential, manufacturability, and market relevance.

- Solutions for extended cycle life, cost-efficient recyclability, and sustainability by design (implementing Safe and Sustainable by Design principles)
- Solutions for enhanced safety, thermal management, performance monitoring, and predictive diagnostics.

The Safe and Sustainable by Design[139] (SSbD) framework should be considered as a reference for project proposals to guide the innovation process towards safer and more sustainable chemicals and advanced materials.

Proposals could consider the involvement of the European Commission's Joint Research Centre (JRC)[140] whose contribution could consist of performing experimental or desk-top research on battery performance 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[141] (EU Science Hub) on the NCP portal, or request specific information from the JRC (JRC-NCP-Network@ec.europa.eu)

JRC will 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) and the co-programmed Partnership Innovative Advanced Materials for the EU (IAM4EU). As such, projects resulting from this topic will be expected to report on the results to the European Partnership on Batteries (Batt4EU) and IAM4EUin support of the monitoring of its KPIs.

This topic contributes to the industrial action plan for the automotive sector.

HORIZON-CL5-2027-05-D2-08: Demonstration for Long-duration Battery Energy Storage Systems (BATT4EU Partnership)

Call: Cluster 5 Call 05-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 9.55 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 19.09 million.
Type of Action	Innovation Actions

139 https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/key-enabling-technologies/chemicals-and-advanced-materials_en
140 https://joint-research-centre.ec.europa.eu/laboratories-z/battery-energy-storage-testing_en
141 JRC NCP | Horizon Europe NCP Portal

Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). The Joint Research Centre (JRC) may participate as member of the consortium selected for funding as a beneficiary with zero funding, or as an associated partner. The JRC will not participate in the preparation and submission of the proposal - see General Annex B.
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B. Activities may start at any TRL.

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

- Demonstrated system-level long-duration energy storage (LDES) solutions, explicitly aimed at enhancing grid stability, resilience, and flexibility in Europe.
- Substantial reduction of Europe's dependence on critical raw materials through the use of abundant, low-cost, and sustainable materials.
- Contribute to strategic insights for a coherent EU-wide stationary storage deployment strategy, enhancing European energy autonomy and sustainability.
- Sufficient and reproducible operational data and insights to serve as reliable input towards detailed technoeconomic analyses.

Scope: Proposals should focus on system-level demonstrations of innovative long-duration (> 8 hours) battery storage concepts that can effectively support utility-scale energy systems or industrial consumers in achieving energy security and operational sustainability.

Projects are expected to cover all the following points:

- Demonstration of advanced long-duration storage technologies not yet on the market such as novel redox flow batteries (standard or mediated), high-temperature systems, metal-air systems, multivalent chemistries (organic or aqueous), or other non-commercialised technologies or architectures.
- Assessment and definition of use case(s) intended for the proposed technology (front-of-the-meter grid-scale storage, behind-the-meter large industrial energy consumer, firming of renewable generation) along with quantified impact on improved grid resilience, reduced emissions, safety, and lowered energy storage cost.

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- Assessment of hybridization potential of complementary energy storage technologies (e.g., redox flow batteries with supercapacitors) to optimize overall system performance for the intended use case(s) and extending system lifecycle.

- Utilization of abundant, low-cost, and sustainable materials, explicitly prioritizing materials with reliable and scalable European supply chains, accompanied by realistic and detailed pathways to production routes at scale.

- Integration of advanced digital technologies, for accurate state-of-charge (SOC), state-of-health (SOH), and lifetime predictions, optimizing battery management systems (BMS), energy management systems (EMS), and overall component performance for extended system longevity.

- Comprehensive techno-economic analyses, including realistic assessments of CAPEX, OPEX, based on measured technical performance metrics (e.g., self-discharge rates, calendar life, cycle life, round-trip efficiency, necessary safety investments) to clearly establish economic viability and competitiveness for the intended use-case in comparison to the commercial, incumbent technology.

- Comprehensive safety assessment at system-level, documenting potential concerns (e.g. flammability, toxicity, explosion potential) and mitigation strategies ahead of widescale adoption of technology.

The Commission initiative for Safe and Sustainable by Design[142] (SSbD) sets a framework for assessing the safety and sustainability of chemicals and materials which should be considered as a reference for project proposals.

Whenever the expected exploitation of project results entails developing, creating, manufacturing and marketing a product or process, or in creating and providing a service, the plan for the exploitation and dissemination of results must include a strategy for such exploitation. 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)[143] whose contribution could consist of performing experimental or desk-top research on battery performance 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[144] (EU Science Hub) on the NCP portal, or request specific information from the JRC (JRC-NCP-Network@ec.europa.eu)

142 https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/key-enabling-technologies/chemicals-and-advanced-materials_en

143 https://joint-research-centre.ec.europa.eu/laboratories-z/battery-energy-storage-testing_en

144 JRC NCP | Horizon Europe NCP Portal

JRC will 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.

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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 efficient and competitive European renewable energy and renewable fuel technologies with a solid knowledge base and are able to deploy them to enhance the EU's energy security and reach its climate neutrality objectives, 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, competitive, resilient, reliable, sustainable, and affordable value chains of renewable energy and renewable fuel technologies including emerging ones, and with strong export potential to supply both the EU internal and global markets. They benefit also from circular renewable energy technologies that are safe and sustainable by design with reduced and diversified external dependence on critical raw materials.

3. **Economic sectors** benefit from better integration of renewable energy and renewable fuel-based solutions that are, among others, competitive, cost-effective, efficient, flexible, reliable, and sustainable. Such integration is facilitated through digitalisation and integration of artificial intelligence of renewable energy technologies that provide network stability and reliability.

4. **European industries** benefit from a reinforced export potential of renewable energy and renewable fuel technologies, also through international partnerships, and become more competitive in innovative renewable energy technologies in Europe and globally.

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5. **European researchers** benefit from a stronger community and from a reinforced scientific basis on renewable energy and renewable fuel technologies including emerging ones, also through international collaborations.

6. **European citizens** have access to an energy market that is fair and equitable, more resilient, uses all different types of local renewable energy resources, and is less dependent on fossil fuels imports. Citizens experience less fuel and energy poverty, and also benefit from new employment and upskilling opportunities. Local communities benefit from a more decentralized, affordable, and secure energy system and from multiple uses of land and water.

Energy systems, grids and storage

1. 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 **work better for actors** and supply **more reliable, resilient and secure energy** – even under increasingly more frequent extreme climate events.

2. The solutions developed will contribute to **increase flexibility and grid hosting capacity for renewables** through optimizing cross sector integration and grid scale storage as well as cover off-grid situations. They will improve the preparedness of the electricity system to support the EU's binding target for 2030 of minimum of 42.5% renewables in the gross final energy consumption (with the aspiration to reach 45%), and full decarbonisation by 2050. They will **enable further electrification of demand** and will enhance the **competitiveness of the European value chain**, reduce pressure on resources (also by making technologies 'circular by design') and decrease dependencies. Such solutions would also enable a better EU resilience to climate risks.

3. The solutions will **improve consumer awareness and engagement** in the energy transition, via innovative offers and services (e.g. demand response, energy communities) and will target different types of consumers, including "hard to reach" population groups (such as energy poor or low-income households). This will result in increased trust in, and uptake of the new products and services entering the energy system.

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

1. Accelerated deployment of carbon capture, use and storage (CCUS) as a CO2 emission mitigation option in electricity generation and/or in industry applications, as well as carbon dioxide removal for negative emissions.

Global leadership in renewable energy

Proposals are invited against the following topic(s):

HORIZON-CL5-2026-03-D3-01: Targeting key value chain components for increasing the competitiveness of renewable energy technologies in Europe

Call: Cluster 5 Call 03-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 9.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 4-5 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [145].

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

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

[145] 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

- Strengthen European autonomy, research capacity and industrial leadership on solutions for competitiveness-related aspects of renewable energy value chains.
- Develop technical and value chain solutions addressing key aspects improving the competitiveness of renewable energy technologies.

Scope: In scope is the development of solutions, which addresses specifically critical aspects affecting the competitiveness of specific renewable energy technologies and their value chains from the source to the sink of the energy in a clear and significant way (by targeting e.g. issues such as bottle necks, game-changer technologies, primary costs). Proposals should focus on development of solutions critical for competitiveness in the European context in the long run. Issues which can be addressed include for example: Material efficiency and circularity, including repair possibilities, lifetime extension and end-of-life management, access to fully sustainable low-cost feedstock, digital and AI tools during capacity build-up and operation, technologies for sustainable and efficient horizontal and vertical value chain optimisation, optimisation of logistics and production pathways, expert knowledge and training (Other relevant issues can equally be addressed). Proposals should, where applicable also assess the benefit/cost of domestic ownership for given value chain solutions.

HORIZON-CL5-2026-04-Two-Stage-D3-02: Next generation of renewable energy technologies

Call: Cluster 5 Call 04-2026 (2-stage) (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 24.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 4-5 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of	The rules are described in General Annex G. The following exceptions apply:

the Grant Agreements	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) [146].

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

- Breakthrough and game changing renewable energy technologies enabling a faster transition to a net-zero greenhouse gas emissions EU economy by 2050.
- Measures, knowledge and data have been demonstrating that the technology has a minimal environmental impact, has gained citizens' trust, is economically viable and benefits from a multi-level policy support.
- Establishing a solid long term dependable European innovation base.

Scope: The proposal is expected to address high-risk and high return technology developments for game changing renewable energy technologies. It could cover, for example, catalyst development, renewable energy storage systems, integration of renewable energy technologies into a single energy generation system, hybrid renewable energy systems, heating & cooling systems, fuels production systems, (direct) solar fuels and solar driven chemical processes, hybrid electricity generation solutions between different renewable energy sources, direct utilization of renewable energy sources.

The following areas are excluded from the scope of the topic as they fall within the scope of partnerships or other calls:

- Hydrogen production through electrolysers.
- Fuel cells.
- Basic material research.
- Batteries.

The proposal is expected to establish technological feasibility of its concept through a robust research methodology, at least TRL 4 or at most TRL 5. The concept could be based on a new solution or on the improvement of an existing high-risk and high-return solution. Technology

[146] 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

transfer from sectors other than energy should be considered whenever relevant, as it may provide ideas, experiences, technology contributions, knowledge, skills, and new approaches.

For bioenergy or biofuel concepts, whenever the direct use of biogenic waste is considered, resource availability and treatment will be taken into account from the design stage.

In developing its concept, the proposal is expected to address the following related aspects: lower environmental impact, minimise impacts on biodiversity and protected species and habitats, better resource efficiency (materials, geographical footprints, water, etc…). Whenever risks have been identified, mitigation measures need to be presented.

The proposal is expected also to present a comparison with current commercial renewable energy technologies and/or solutions to show its advantages in terms of expected economic performance, environmental impact, energy security, competitivity and industrial independence.

Selected projects are expected to consider the drivers behind social acceptance and trust-building of the technological solution and assess the best way to promote local involvement as part of ensuring a just transition (gender, cultural and socio-economic factors should be accounted for). An analysis of policy approaches that are encompassing (policy mixes), adaptive (policy learning) and context sensitive (working for different places, levels and/or sectors) should also be performed in order to support the deployment of the future new technology.

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.

Proposals are encouraged to consider, where relevant, services offered by European research infrastructures[147], as well as related projects offering access to research infrastructures in the clean energy domain- particularly RISEnergy[148].

HORIZON-CL5-2026-11-D3-03: Strategic Energy Technology (SET) Plan wind energy research and innovation joint programme

Call: Cluster 5 Call 11-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 93.50 million would allow these outcomes to be addressed

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

148 RISE Energy- Homepage -

	appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 93.50 million.
Type of Action	Innovation Actions
Admissibility conditions	The conditions are described in General Annex A. The following exceptions apply: Due to the complexity of the topic, the page limit for proposals is increased to 60 pages.
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: For all activities the maximum EU funding rate is 70% of the eligible costs (excepts for non-profit legal entities, where a rate of up to 100% applies). The following exceptions apply: Beneficiaries must provide financial support to third parties (FSTP). The support to third parties can only be provided in the form of grants. In derogation to article 208 EU Financial Regulation, the maximum amount to be granted to each third party can exceed EUR 60,000 and reach up to EUR 2 000 000. This derogation is motivated by the fact that FSTP actions are expected to include very high capital intensive and labour-intensive activities. In fact, wind energy systems and components entail large and complex equipment that pose significant challenges and costs in the manufacturing, transport, installation, operation and maintenance and decommissioning. This is even more relevant for offshore operations.

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

- Implementation of the Strategic Energy Technology (SET) Plan research and innovation priorities for wind energy;
- Efficient and effective support to wind energy research and innovation through alignment and cooperation among different actors, avoiding fragmentation of efforts;
- Energy producers and consumers benefit from increased performance of wind energy technologies with the focus on efficiency and flexibility, reduced cost, improved reliability and sustainability, operation and maintenance, robustness and security during all stages of the lifetime of a wind energy farm from installation, operation and maintenance to decommissioning;
- Increased contribution of wind energy to the energy system, with minimal impacts on health and the environment (notably biodiversity) and at the lowest possible cost.

Scope: The project implements the Strategic Energy Technology (SET) Plan research and innovation priorities for wind energy, taking into account the input defined in this context by the Implementation Working Group (IWG) on wind energy, the European Technology and Innovation Platform on wind energy (ETIP Wind)[149] and the European Energy Research Alliance (EERA) joint programme on wind energy[150].

The activities carried out by the project will pertain to the following priority R&I areas:

a. Industrialisation, scale-up and competitiveness: mass production supported by automation and reliable supply chains, design for large volume manufacturing and deployment, design for reliable and lasting products and improved construction and installation methods, digitalisation and artificial intelligence (AI) in industrial environment.

b. Optimisation and further digitalisation of operation and maintenance: integration of artificial intelligence (AI), robotics, advanced repair methodologies and new sensor technologies, interoperability among wind farm sub-systems, advanced communication technologies and cybersecurity, innovative component replacement solutions and quick connect/disconnect systems for mooring lines and inter-array cables.

c. Wind energy system integration: definition and modelling of future system needs, advanced grid capabilities, interoperability, solutions to effectively manage curtailment, integration with energy storage technologies and hybrid plants, distributed wind energy.

d. Sustainability and circularity: material substitution for decarbonisation, material reduction, recycling methods, lifetime extension via re-using, refurbishing and re-purposing, new decommissioning tools and methods and solutions to minimise the environmental and biodiversity impacts and optimise the socio-economic impacts.

149 See for instance: ETIP Wind Strategic Research & Innovation Agenda 2025-2027 - November 2023

150 See for instance: NeWindEERA – A New Research Programme for the European Wind Energy Sector – September 2024

e. Floating offshore wind: development and demonstration of innovative technologies for offshore floating wind. Development of optimised floating wind energy systems through the integrated design of the different elements of the system, including the floater and the generation part.

f. Research and technology infrastructures for wind energy: upgrade of existing and establishment of new infrastructures and test centres for the sector. An area of particular interest in this domain are large-scale testing facilities for offshore floating wind energy systems.

g. Wind energy systems interactions with climate, atmosphere, ocean and geophysics: geophysical characteristics measuring and modelling, wake effect model development, climate change impact analysis

h. Environmental and social aspects, coexistence: evolution of environmental impact assessments, spatial planning, biodiversity solutions, design and implementation of practices and platforms that facilitate inclusive communication and stakeholders' involvement, tools to map stakeholder concerns and development of practical approaches to lifecycle public participation, socialisation of wind rights, relationship between people, technology and places for all relevant social issues

i. Emerging technologies: new concept assessment and development (e.g. multirotor concepts, airborne wind, small wind turbines, tip rotor designs, ducted turbines), improved performance and efficiency of emerging/innovative wind energy systems

Structure, breakdown of activities and budget allocation

The action consists of activities directly implemented by the main consortium and of activities implemented through financial support to third parties. The R&I activities are divided into three challenges:

a. Breakthrough challenge

b. Validation challenge

c. Demonstration challenge

The breakthrough and the validation challenge can be carried out both through activities directly implemented by the core consortium and through FSTP activities.

The breakthrough challenge entails actions to develop new and disruptive solutions, tools and new knowledge to increase the competitiveness of the wind energy sector and on the acceleration of wind energy deployment at scale both off- and onshore. Concepts and technologies initially developed through the breakthrough challenge could be further matured through the validation challenge.

The validation challenge entails actions to validate technologies, tools and innovative solutions up to TRL 6 that have been developed in the project but also developed previously and

separately in other European and national projects. FSTP has to be used for new illustrative application use-cases demonstrating well defined added value to end users.

The demonstration challenge entails demonstration activities to accelerate the take up of innovation by the industry, in line with the priorities set by the SET Plan (activities up to TRL 7-8). It will solely be implemented by the core consortium.

The total maximum amount of EU funding for the demonstration activities should be 50 million Euros.

The project is expected to implement at least 3 demonstration activities. The focus of each demonstration activity should be clearly different from each other. The proposed solutions should be demonstrated for a continuous period of at least 6 months.

Proposals should also foresee that each demonstration activity includes a clear go/no go milestone before entering the deployment phase. Before this go/no-go milestone, the project has to submit i) proof of solid engagement of the industrial demonstration party, ii) all needed permits for deployment, iii) credible and detailed engineering plans, and iv) a complete business and implementation plan.

Privileged research and innovation areas for the demonstration challenge are the ones listed from a. to f. in the scope: a. industrialisation, scale-up and competitiveness, b. optimisation and further digitalisation of operation and maintenance, c. wind energy system integration, d. sustainability and circularity, e. floating offshore wind and f. research and technology infrastructures for wind energy.

Activities directly implemented by the core consortium

The activities of the core consortium include the implementation of direct research and innovation activities in any of the areas listed in scope and in any of the challenges (breakthrough, validation, demonstration). The core consortium will be responsible for the management of the whole project, including the actions carried out through financial support to third parties (management of the FSTP calls, management of the FSTP projects). It is expected that the budget dedicated to the project management will not exceed 7% of the EU funding.

Activities implemented through Financial Support to Third Parties (FSTP)

A share of the EU funding will be implemented through financial support to third parties and used to support research organizations, academia, start-ups, scale-ups, SME's, industries and other entities and to enable use-cases that are not yet identified in the proposal stage.

The use of financial support to third parties should allow a faster implementation of research and innovation activities, attracting different stakeholders and innovators which couldn't be identified in the proposal phase. A tiered approach to address complex R&I challenges should be adopted via FSTP calls, meaning that projects with a relatively short duration should be supported (e.g. 12-18 months). A given action supported by FSTP can be implemented by one third party or by a (small) consortium of entities. Subsequent FSTP calls can be used to give

further support to successful initiatives. The calls should be planned carefully and ensure that successful R&I work can continue without major interruption.

The FSTP calls should relate to the breakthrough challenge and the validation challenge.

- Breakthrough challenge: The proposal should foresee consecutive FSTP calls for the development of breakthrough technologies and innovative solutions in support of the long-term R&I challenges. Up to 8 million EU funding should be used to set up this 'Breakthrough technologies' challenge for third parties. The FSTP breakthrough challenge should aim at attracting innovative entities that does not necessarily have the capacity to apply directly for EU grants.

- Validation challenge: The proposal should foresee consecutive FSTP calls for the validation of innovative technologies/solutions from earlier R&I projects up to TRL 6. Up to 16 million EUR EU funding is expected to be used for subsequent FSTP calls.

The first FSTP call for the breakthrough challenge should be published in the first year. The FSTP calls for the validation challenge must be planned in a later stage considering the experience and the results of the breakthrough challenge and/or the core project R&I activities. The duration of the actions supported by FSTP should not be longer than 18 months.

The activities carried out through FSTP calls can pertain to any of the research and innovation areas listed in scope. The applicants must clearly describe in their proposal the objectives and the expected results of the FSTP call.

The following conditions must be fulfilled:

– projects must publish their open calls widely and adhere to EU standards of transparency, equal treatment, conflict of interest and confidentiality;

– all calls for third parties and all calls that are implemented by third parties must be published on the Funding & Tenders Portal, and on the beneficiaries' websites;

– the calls must remain open for at least 2 months;

– if submission deadlines are changed, this must immediately be announced and registered applicants must be informed of the change;

– projects must publish the outcome of the calls without delay, including a description of third-party projects, the date of the award, the duration, and the legal name of the third party and country of establishment;

– the calls must have a clear European dimension.

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FSTP activities must be implemented according to the European Commission's guidance on the subject[151].

Governance of the project

The project must define its overall governance, establishing how the detailed R&I priorities to be supported are defined. It will have to set out how and with what frequency the calls for proposals to be funded through financial support to third parties (FSTP) are organised and how the evaluation of these proposals is carried out. The core project consortium needs to define the selection criteria and the process and criteria of organisations, for which financial support may be granted, ensuring compliance with the FSTP rules under Horizon Europe. The proposal should describe clearly the methodology to implement the various steps of the FSTP calls, define the specifications of the stages of the competitions, timelines, targets, KPIs and a solid evaluation methodology including evaluation criteria. The consortium is also responsible for ensuring high visibility of the FSTP calls.

The core consortium is expected to demonstrate proven experience in sound financial management of large projects, including public procurement and/or calls and grants to support third parties, in particular for the beneficiary which will run the FSTP calls.

The project sets up an Advisory Board, composed of experts in wind energy systems' research and innovation, representing public and private entities that are third parties to the beneficiaries of the project. A representation of the SET Plan Implementation Working Group (IWG) on Wind Energy and of the European Commission should be as well part of the Advisory Board. The consortium will ensure that the advice of the Advisory Board is appropriately taken into account in the project's implementation. This will be monitored by the granting authority.

The proposal should also foresee as a project deliverable every year to the granting authority an assessment of the progress of all R&I activities. Therefore, it should embed mechanisms to assess and demonstrate progress (with qualitative and quantitative key performance indicators (KPIs), benchmarking and progress monitoring). Besides defining and tracking progress of technology-specific KPIs in the technology areas specifically covered, the project will monitor and report on the contribution towards the high-level SET Plan KPIs defined by the SET Plan community in the wind energy sector[152]. As a part of this deliverable, the project will confirm in detail the activities to be carried out for the next year, the objectives, the budget and the respective implementation modalities, namely what are the activities carried out directly by the main consortium and what are the ones implemented through financial support to third parties (FSTP). These annual reviews will be defined as milestones of the project and, as such, they will be subject to the approval of the granting authority.

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151 European Commission (2025), Good practices for implementing financial support to third parties (FSTP) in EU grants.

152 ETIP Wind, EERA JP Wind and IWG Wind (2025); "From innovation to industrial competitiveness – How wind R&I funding will deliver European technology sovereignty". URL: https://etipwind.eu/wp-content/uploads/files/publications/20250408-Etipwind-report.pdf

The consortium will have to present a clear risk and mitigation plan. In this plan special attention should be paid to the risk that the chosen demonstration actions will not reach a go-decision.

In the project proposal, the consortium will have to describe a detailed work plan for the whole duration of the project, including the activities to be carried out directly by the core consortium and the ones carried out through financial support to third parties (FSTP). A given action supported by such FSTP scheme can be implemented by one third party or a by consortium of entities.

The project will, as regards data management, set-up a platform, possibly re-using an already existing one, to ensure the accessibility and maintenance of the data generated by the project. The platform should be able to organise and host data generated by other research and innovation projects on wind energy. 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)

The consortium should define measures to maximise the impact of the successful project and for that will contribute to the relevant Knowledge Community and Impact Network of the Clean Energy Transition Partnership and share communicable results with the European R&D community.

Cooperation with International Energy Agency (IEA) Technology Collaboration Programme (TCP) on wind energy systems

For activities covered by relevant initiatives under the International Energy Agency Technology Cooperation Programme for wind energy systems, proposals should foresee liaising with these initiatives to consider possible synergies, cooperation and mutual sharing of knowledge.

Duration

The estimated project duration is around 5 years.

HORIZON-CL5-2026-11-D3-04: De-risking renewable fuel technologies through transnational pre-commercial procurement of renewable fuel industrial value chains

Call: Cluster 5 Call 11-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 40.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 40.00 million.
Type of Action	Pre-commercial Procurement

Admissibility conditions	The conditions are described in General Annex A. The following exceptions apply: Due to the complexity of the topic, the page limit for proposals is increased to 60 pages.
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).

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

- Public authorities, industry, technology providers, energy producers and consumers profit from de-risking of cost-effective essential value chains of those renewable fuel technologies that can contribute to domestic commercial fuel production beyond 2030 customized to their needs, from improved access to better financing exploiting synergies across funding schemes, and from more effective market uptake, business models, increased competitiveness, and commercialization opportunities.
- Energy producers, clean tech manufacturing industries, researchers and consumers benefit from improved performance, security and competitiveness of ad-hoc renewable fuel technologies compared to existing ones, as well as new market opportunities.
- Community, public authorities and industry benefit from sharing the de-risking cost and reducing it by engaging several competing solution suppliers/technology providers in parallel, boosting transnational public and private investments in de-risking and attracting new players to tackle supplier lock-in issues
- The implementation of the Strategic Energy Technology Plan (SET Plan) Action of Renewable Fuels and Bioenergy is supported and facilitated by better alignment of public and private R&I priorities and of funding mechanisms.
- Policy makers and regulators are provided with evidence to accelerate permitting procedures and increase the public acceptance of innovative and sustainable renewable fuel projects improving the regulatory framework.

Scope: An exceptional effort is needed to develop, demonstrate and de-risk essential renewable fuels technologies and establish their industrial value chains in a cost-effective way to cover the EU needs where renewable fuels are the main long-term solution. Proposals should steer the development of these technologies at EU level and bring them to the market. Pre-commercial procurement of R&D, validation and possibly, first deployment of industrial value chains of essential renewable fuel technologies is considered an effective tool to de-risk such

activities and overcome the "valley of death" because real take off by engaging primarily concerned contracting entities is expected. The scope of this action is to design and bring industrial value chains of essential renewable fuel technologies at TRL 8 by the action end. The competitive development in phases of entire industrial value chains should built upon existing knowledge on technology and value chain readiness based on existing EU projects and studies, thus speeding up the de-risking.

'Transnational buyers' could be public plus possibly one or more private procurers, and that provide similar services of public interest. The buyers will collectively develop and implement the pre-commercial procurement of R&D services from a number of providers and designate a lead procurer to award the contracts. The procurement must be open to providers of R&D services established in any EU Member States and Associated Countries.

Inclusiveness of a broad range of public and private procures across EU and Associated Countries and across national borders is encouraged, to effectively share the risk and benefit from creating in the EU market readiness of industrial value chains of essential renewable fuel technologies. Public and private EU airport and port authorities and their respective managing bodies, aircraft operators and shipping companies, other state, regional or local authorities and bodies governed by public law or their associations, are some examples of expected public[153] and private procurers with an incentive to improve solutions in areas of public interest, such as reduction of greenhouse gas emissions from energy supply as fuels.

The consortium is encouraged to plan activities during the project to raise awareness to the R&D providers that will win PCP contracts about unlocking and increasing their investment capacity in the field of renewable fuel technologies, for example by using possible combinations of the PCP procurement contract with additional support for companies from the EIC, InvestEU, regional funds or possibly other sources of Union funding. Participation of public contracting authorities and entities managing or funding such funds in the project is encouraged. In addition, the procurers should include in the proposal what will be their planned approach for deployment in case the PCP results in successful solutions; this could be through a combination of deploying a limited set of solutions already during the PCP project and/or foreseeing a deliverable that prepares follow-up procurement to purchase (larger volumes of) such type of solution(s) after the PCP.

Essential value chains to de-risk should be based on identified technologies by our studies[154] (i) – vii) below) as those that can contribute essentially to domestic commercial fuel production beyond 2030, and possibly other that can be demonstrated at commercial scale by the end of the execution phase of the project[155]:

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153 Public contracting authorities and entities as defined in REGULATION (EU) 2021/695, Directives 2014/24/EU and 2014/25/EU

154 a) Study on Development of Outlook for the Necessary Means to Build Industrial Capacity for Drop-in Advanced Biofuels - European Commission, b) How To Mobilize Industrial Capacity Building For Advanced Biofuels

155 All hydrogen used to the production of the synthetic fuels should comply with the EU legislation on the renewable and low carbon methodology, i.e. the processes of Steam Methane Reforming using fossil fuels for the production are out of the scope, as there is no RI associated to these methods.

i. Production of advanced bioEthanol and further processing into ATJ-SPK

ii. Biomass Gasification and FT-Synthesis to produce FT-SPK

iii. Production of BioMethanol for further processing into MTJ

iv. Hydrotreatment of Lipids from marginal/contaminated lands to produce HEFA

v. Biomass Pyrolysis and Upgrading or co-processing to produce biokerosene and bio-heavy fuel oil

vi. Biomethane from AD and Gasification and Methanation to produce biomethane for shipping or further processing into methanol (methanolysis) for shipping

vii. E-Methanol production from CO2 and renewable H2 for shipping

Industrial value chains of the essential renewable fuel technologies should be developed based on domestic sustainable feedstocks across EU and Associated Countries and on also creating synergies across all end use energy and transport sectors for markets and production facilities for renewable fuels.

Hydrogen production as end-product is not in scope.

HORIZON-CL5-2026-11-D3-05: Demonstration of solid biofuel supply and conversion to large scale CHP from fully sustainable regional value chains

Call: Cluster 5 Call 11-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 14.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B. Activities may start at any TRL.

Expected Outcome: Fully sustainable regional bioenergy value chains and efficient conversion can play an important role in renewable efficient power and heating generation and for reaching the EU climate and energy targets and contribute to European competitiveness and energy security.

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

- The demonstration of regional value chains for the use of locally to regionally sourced sustainable and cheap solid biofuel from upgraded biogenic residues and wastes in large-scale CHP plant creates opportunities for SMs, regional value generation and European knowledge advancement and international competitiveness in the sector.
- Provide flexible renewable power and heat to local industries for their processes and allow for high penetration of renewables in the energy system by ensuring sustainable bioenergy base load capacity.
- Provide replicable solutions, where bioeconomy stakeholders can benefit from the knowledge generated for the development of their strategies aligned with energy and environmental policy objectives and which can contribute to the objective of decreasing the EU's and Ukraine`s dependence on fossil fuels and increasing energy security.
- Regulatory and permitting authorities as well as investors and important actors of the value chain are in a better position to assess socio-economic and environmental aspects of the value chain, in particular on circularity, industrial resilience biodiversity and soil carbon.

Scope: Demonstration of a viable regional value chain for the use of locally to regionally sourced sustainable and cheap solid biofuel from upgraded biogenic residues and wastes in large-scale CHP plants for continuous, cost-effective and low emission operation.

Proposals are expected to cover long-term scenarios for base load operation within the energy system network ensuring socio-economic and environmental sustainability and in particular the exclusion of negative impacts on biodiversity, water balance, air quality and soil carbon stocks and other bioeconomy sectors which should be assessed by a comprehensive life cycle analysis.

To lower possible local ecosystem interferences, solid biofuels are expected to be produced with the use of innovative preprocessing and upgrading technologies and through the adoption of advanced supply chains from a mixture of residues and wastes and exclude negative impacts not only overall, but in each individual harvest location, which results in specific operational, economic and logistical and supply chain challenges to be addressed. Proposals should foresee at least one regional value chain demonstration including use of the solid biofuel with verified quality and occurring GHG reduction in an operational large-scale CHP plant.

Proposals are expected to demonstrate ways for efficient, cost-effective, robust, resilient and low pollution retrofitting of existing CHP plants in a local industrial context.

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. In this respect,

collaboration with suitable networks like e.g. bioenergy clusters should be envisaged to avoid the development of overly site-specific solutions and to enhance replicability . 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). Special attention should be paid to estimating the GHG emissions reduction potential; projects will be encouraged to use the methodology in the Innovation Fund. Projects are expected to include at least one relevant local economic business case, outlining local value and supply chains and the expected number of local jobs including the overall industrial ecosystem at the place of deployment. Projects are encouraged to support the reconstruction of Ukraine by covering regional value chains in Ukraine and/or Ukrainian beneficiaries.

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, SSH research should look specifically at how synergies can be enhanced to achieve the topic's objective in respect of socioeconomic sustainability. A gender-sensitive approach can inform the development of inclusive solutions, addressing the needs of all stakeholders in the context of solid biofuel supply and conversion to large scale CHP.

HORIZON-CL5-2026-11-D3-06: Concentrated solar thermal systems for decarbonising industrial processes

Call: Cluster 5 Call 11-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 12.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 7 by the end of the project – see General Annex B. Activities may start at any TRL.

Legal and financial set-up of the Grant Agreements	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) [156].

Expected Outcome: Renewable heating can be directly used to efficiently decarbonise industrial processes. Concentrated solar thermal technologies offer a great potential to supply renewable heat for industry for temperatures between 150°C - 400°C. Nevertheless, efforts are still required to demonstrate these technologies for a variety of industrial processes.

Proposals are expected to contribute to all the following outcomes:

- Showcase the capacity of concentrated solar thermal systems to largely meet the heat demand of industrial processes and to achieve a yearly solar fraction of at least 50%.
- Increase competitiveness of concentrated solar thermal for industrial applications. This must be proven by an economically feasible business case; by reducing the Levelised Cost of Heating (LCoH); and by valorising and promoting the competitive advantages of the technology such as heat storage, flexibility, and energy security.

Scope: The proposals are expected to demonstrate concentrated solar technologies for heat production (within the 150°C - 400°C range), combined with storage, feeding the generated heat to existing heating and/or cooling processes in industry, e.g., drying, melting, sterilisation, refrigeration, etc.

The proposals are expected to efficiently integrate the solar heat system in the selected industrial application. To a possible extent, the proposals should optimise energy efficiency and heat recovery of the industrial process to maximise the coverage of the heat demand by the solar system and to ensure an efficient solar investment. Hybridisation with other on-site renewable energy technologies could be considered. However, the core solutions are expected to focus on the concentrated solar thermal part and not on the industrial process or on the hybrid renewable energy technologies.

Proposals should foresee demonstrating the envisioned solution in all possible solar incidence, and for a continuous period of at least 6 months. The replicability potential to other industrial processes should also be taken into account.

[156] 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

The proposals are expected to address the techno-economic feasibility and the environmental impact of the proposed systems, as well as specific issues related to the integration of the solar systems in the industrial process such as surface availability.

The project is expected to include a clear go/no go milestone before entering the deployment phase. Before this go/no-go milestone, the proposal should foresee submission of i) proof of solid engagement of the industrial demonstration party, ii) all needed permits for deployment, iii) credible and detailed engineering plans, and iv) a complete business and implementation plan.

The use of the European Research Infrastructure for concentrated solar power EU-SOLARIS is encouraged but not mandatory.

HORIZON-CL5-2026-11-D3-07: Resource assessment for deep sedimentary and basement reservoirs

Call: Cluster 5 Call 11-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 4.75 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 19.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 4-5 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [157].

Expected Outcome: Deep sedimentary/basement reservoirs are usually characterized by low permeability, high drilling cost and a scarcity of data, as they are typically ignored by hydrocarbon exploration. Major exploration challenges relate to predicting deep sedimentary and basement reservoir structures and properties to identify suitable locations for reservoir-independent approaches, capable of overcoming the low permeability obstacle, such as Enhanced Geothermal Systems (EGS) or closed-loop geothermal systems.

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

- Increased knowledge base for developers to unlock unexploited geothermal resources, increase drilling success rate, increase geothermal sources performance and reduce the risk of induced seismicity and deploy geothermal energy in a sustainable way in environmental and socioeconomic terms.
- Citizens and local communities are engaged and benefit from local, more secure and affordable renewable energy sources.

Scope: Advanced methods, technologies and conceptual models, for different geological settings, to identify suitable conditions for geothermal resource exploitation, tackling the issue of data scarcity and leveraging the information available. The proposals are expected to contribute to the assessment of environmental and social impacts and to unlock geothermal resources marked by low natural permeability at depths between 2000-6000m.

The scope covers advances beyond the state of the art in equipment, methods and models capable of providing in-depth understanding and predictive power for properties and processes beyond conventional depths. The proposals are expected to take into account the impact of reservoir conditions and parameters (i.e. in-situ stress, temperature, geo-mechanical, chemical properties) on the development and performance of the geothermal resources, covering, when relevant, aspects such as the suitability for different stimulation techniques, well designs and completion technologies, the possibilities for the coproduction of raw materials, wellbore stability.

The proposals are expected to validate the benefit of the proposed solution in the context of state-of-the-art decision and risk analysis methods.

To ensure trust building and communities' support, partners are expected to practice inclusive societal engagement, which is early, continuous, and sensitive to the technical specificities (e.g. land occupation, visual impact, noise as well as geo-mechanical changes (e.g. seismicity) and

[157] 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

underground changes (e.g. disturbance of non-targeted aquifers)) that could affect local communities and ecosystems.

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-CL5-2026-11-D3-08: Inducement Prize - Lithium production from geothermal plants in Europe

Call: Cluster 5 Call 11-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 4.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 4.50 million.
Type of Action	Coordination and Support Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).

Expected Outcome: Lithium has been classified as a "Critical Raw Material" by the EU, as it is used in batteries, which are a key enabler of the clean energy transition, given the important role they play in the rollout of zero emission mobility and the storage of variable renewable energy. As demand for Lithium-ion batteries is expected to increase dramatically soon, a stable and sustainable supply of lithium is of utmost importance.

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

- Facilitate the wider uptake of geothermal energy systems (RES) in the energy, industrial and residential sectors leading to an increased share of renewable energy in the final energy consumption by 2030 and beyond.
- Contribute to the development of a new renewable based energy system and industries.
- Establishing a solid long term dependable European innovation industrial base for renewable energy technologies.

Scope: The aim of this prize is the on-site demonstration of lithium production (lithium carbonate – Li_2CO_3 or lithium hydroxide – LiOH) from geothermal brines in a geothermal plant subject to meeting the eligibility requirements outlined below.

Geothermal plants can potentially apply Direct Lithium Extraction (DLE) technologies and produce lithium, and other critical minerals, from geothermal brines. But the widespread development and adoption of DLE systems is still subject to ongoing research, technological advancements, and economic viability.

The prize competition is expected to stimulate progress in the field by advancing DLE technologies, and to commence and increase the amount of lithium produced in Europe's geothermal plants.

The proposal is expected to:

- finalise of the rules of the contest, based on the full design provided in the Study on prize development for renewable energy systems (recognition and inducement prizes)[158]
- to launch the prize by Q1 2027
- to promote the prize and interface with the contestants.
- To organise the jury and selection of the winners, 1st, 2nd and 3rd places
- To organise the award ceremony and award the prize by Q4 2031.

The proposal is also expected to allocate €4 million (EUR 4.000.000) of the requested budget to the prize, that is, to be distributed to the three first contestants.

The proposal will present how the above points will be implemented, how it will maintain the policy link, and ensure strong participation and impact both during and after the competition, particularly support the participation of women entrepreneurs in the prize competition.

HORIZON-CL5-2027-02-D3-09: Co-funding Strategic Energy Technology (SET) Plan renewable fuel value chains at EU, national, regional, and local level

Call: Cluster 5 Call 02-2027 (WP2026-2027)
Specific conditions

[158] https://op.europa.eu/en/search-results?p_p_id=eu_europa_publications_portlet_search_executor_SearchExecutorPortlet_INSTANCE_q8EzsBteHybf&p_p_lifecycle=1&p_p_state=normal&queryText=Study+on+prize+development+for+renewable+energy+systems+%28recognition+and+inducement+prizes%29+%3A+final+report.&facet.collection=EULex%2CEUPub%2CEUDir%2CEUWebPage%2CEUSummariesOfLegislation%2CPublicProcurement&startRow=1&resultsPerPage=10&SEARCH_TYPE=SIMPLE

Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 30.00 million.
Type of Action	Programme Co-fund Action
Admissibility conditions	The conditions are described in General Annex A. The following exceptions apply: Due to the complexity of the topic, the page limit for proposals is increased to 60 pages.
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: The funding rate is 70% of the eligible costs. Beneficiaries may provide financial support to third parties (FSTP) in the form of grants. The maximum amount of FSTP to be granted to an individual third party is EUR 500 000 depending on the service provided, by derogation to the EUR 60 000 threshold provided for in Article 204 (a) of the Financial Regulation No 2018/1046. This is justified because FSTP is one of the primary activities to allow the programme co-fund action to achieve its objectives. The cascading grants will support concrete interregional projects to be undertaken by research and innovation entities and stakeholders around the value chain developing or demonstrating technologies and value chains of renewable fuels, requiring high costs for labour and equipment to successfully carry out such activities.

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

- The implementation of the Strategic Energy Technology (SET) Plan Action of Renewable fuels and Bioenergy (for the fuels part) is supported, overcoming fragmentation by mobilizing resources and establishing across EU interregional value chains of renewable

fuel technologies and by better alignment of public and private R&I priorities and of funding mechanisms.

- All sector stakeholders benefit from establishment of **r**enewable fuels value chains at EU, national, regional, and local level overcoming fragmentation across Europe.
- Different stakeholders (e.g., EU, SET Plan countries, regions, communities, etc) benefit from their engagement in the co-creation of a very flexible R&I Programme in renewable fuels.
- Researchers, industry, and public authorities have access to increased knowledge and challenges of the different renewable fuel technologies along their lifecycle and value chains and benefit from synergies to overcome fragmentation of the value chains and from increased critical mass in implementing R&I activities in the area.
- Technology providers profit from technology development, successful demonstration and de-risking of a portfolio of renewable fuel technologies, improved access to better financing exploiting synergies across funding schemes, and from more effective market uptake, increased competitiveness and commercialization opportunities.
- Energy producers, clean tech manufacturing industries and consumers benefit from improved performance and security of a portfolio of renewable fuel technologies and from better exploitation opportunities in a larger and more homogeneous marketplace.
- Policy makers and regulators are provided with evidence to accelerate permitting procedures and increase the public acceptance of innovative and sustainable renewable fuel projects, minimizing negative environmental impacts and improving the regulatory framework.

Scope: Following the revamp of the SET Plan and its anchoring to the NZIA and the European Research Area, it becomes urgent to boost the R&I activities envisaged already under the SET Plan Implementation Plans and their further updates and contribute towards pooling diverse resources to increase the R&I funding and impact across the European Research Area. This action is complementary to existing projects and instruments like the Clean Energy Technology (CET) Partnership[159] with the vision to support, facilitate and reinforce that work by providing a focused programming framework and coordinated network of active and connected stakeholders in renewable fuels.

This action aims to create connected regional renewable fuel value chain activities across Europe, involving regions with lower innovation performances, by sharing and transferring capacities and know-how. The challenge is to overcome fragmentation of the value chains where different regions have different capacities (feedstock, technology, skills) and create

[159] TRI 3: Enabling Climate Neutrality with Storage Technologies, Renewable Fuels and CCU/CCS | CET Partnership

collaboration at EU, national, regional or local level to collectively develop and implement complete value chains of renewable fuel technologies.

The action should contribute to the implementation of the Implementation Plan[160] and its updated version(s) of the Implementation Working Group of Renewable fuels and Bioenergy under the revamped SET Plan. All renewable fuel technologies, both of biological and non-biological origin, at all TRL levels and market up-take measures, which are listed in this Implementation Plan and its updated version(s), but also new identified interregional and transnational challenges across these value chains, are within scope, including for example feedstock standardization, permitting fragmentation and lack of fit-for-purpose business models in rural regions, and using artificial intelligence as appropriate. Activities should draw from the detailed R&I activities program of the Implementation Plan of the SET Plan Action Renewable Fuels and Bioenergy (Annex I) regarding development, demonstration (also at pilot scale) and scale-up of

- Advanced liquid and gaseous biofuels[161] through biochemical / thermochemical/ chemical conversion from sustainable biomass and/or from autotrophic microorganisms and primary renewable energy.
- Other renewable liquid and gaseous fuels[162] (with particular attention to direct solar and algae-based fuels but excluding hydrogen as end-product) through thermochemical/ chemical /biochemical /electrochemical transformation of energy neutral carriers (like CO2 or N2) with renewable energy.
- Solid, liquid and gaseous intermediate bioenergy carriers through biochemical / thermochemical/ chemical conversion from sustainable biomass and further upgrading to advanced biofuels

taking into account the input defined in this context by the Implementation Working Group on Renewable Fuels and Bioenergy, the European Technology and Innovation Platform on Bioenergy (ETIP Bioenergy), the European Energy Research Alliance (EERA) Bioenergy Joint Programme and the SET Plan Direct Solar Fuel forum as its SRIA becomes available.

The action may support networking and coordination, research and innovation, pilot actions, market uptake measures, training and mobility, awareness raising and communication, and dissemination and exploitation across an entire value chain of renewable fuel technologies, thus providing the highest possible flexibility for activities in supporting the related challenges. The action should establish a joint comprehensive plan of activities. The range of activities supported should include an appropriate set of research projects, demonstration projects, technology transfer projects and other activities.

Inclusiveness of a broad range of EU Member States and Associated Countries is expected, aiming at involving also partners coming from Eastern Europe who could enable solutions, thus

160 Action 8 Implementation Plan (in future "Common Implementation Plan")
161 In line with the amended Renewable Energy Directive
162 In line with the amended Renewable Energy Directive

strengthening their engagement in the SET Plan. Participation of public interest legal entities such as state, and notably regional and local authorities, which may have particular interest in regional development of renewable fuel value chains, is encouraged. The consortium is expected to ensure that eligibility for financial support to third parties is extended to all participants established in any EU Member States and Associated Countries.

Implementation of the action should profit from and capitalize the expertise in collaborating and networking of the relevant R&D programmes of national governments of the ERA-NET-Bioenergy network[163] on European research cooperation and coordination related to the field of the SET Plan Action Renewable Fuels and Bioenergy, as well as from the EU ERA-NET BESTF3[164].

The action is expected to have a duration of 5 years. It is expected that the action will organize joint transnational calls on an annual basis and will consider ample time for the implementation of the co-funded projects, notably before its end. Flexibility in defining activities for joint calls and implementing these calls adjusted to specific needs among beneficiaries is encouraged while FSTP must be defined in accordance with legal application requirements[165]. Appropriate monitoring and reporting of the results is expected.

The proposal should envisage to design and carry out coordination and clustering activities of the co-funded projects and also with other Horizon Europe projects of renewable fuels. These activities should also include synergies, communication (joint meetings), dissemination and exploitation and contribute to the Knowledge Community of the CET Partnership.

Hydrogen production as end-product and heat and power production are not in scope.

HORIZON-CL5-2027-02-D3-10: Innovative technologies and solutions to improve wave and tidal energy systems

Call: Cluster 5 Call 02-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 44.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 44.00 million.
Type of Action	Innovation Actions

163 https://international.fnr.de/project-funding/european-projects/era-net/era-net-bioenergy
164 https://cordis.europa.eu/project/id/691637
165 https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/temp-form/af/information-on-financial-support-to-third-parties_he_en.docx

Admissibility conditions	The conditions are described in General Annex A. The following exceptions apply: Due to the complexity of the topic, the page limit for proposals is increased to 60 pages.
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: For all activities the maximum EU funding rate is 70% of the eligible costs (excepts for non-profit legal entities, where a rate of up to 100% applies). Beneficiaries must provide financial support to third parties (FSTP). The support to third parties can only be provided in the form of grants. In derogation to article 208 EU Financial Regulation, the maximum amount to be granted to each third party can exceed EUR 60,000 and reach up to 1.000.000 EUR. This derogation is motivated by the fact that the FSTP actions are expected to include high capital intensive and labour-intensive activities. Ocean energy systems and components entail large and complex equipment that pose significant challenges and costs in the manufacturing, transport, installation, operations and maintenance and decommissioning. For the validation and demonstration it is required to use large test infrastructure which is costly. The FSTP will also be used to support research organizations, academia, startup companies, SME's and other industries which are not yet identified in the proposal stage. A given action supported by the FSTP scheme can be implemented by one third party or a by consortium of entities.

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

- Implementation of the Strategic Energy Technology (SET) Plan research and innovation priorities for ocean energy;

- Energy producers and consumers benefit from increased performance of wave and tidal energy technologies with the focus on efficiency and flexibility, reduced cost, improved reliability and sustainability, operation and maintenance, robustness and security during all stages of the lifetime of an ocean energy farm from installation, operation and maintenance to decommissioning;

- Efficient and effective support to ocean energy research and innovation through alignment and cooperation among different actors, avoiding fragmentation of efforts providing effectively a significant developmental boost of wave and tidal energy technologies.

- Increased contribution of ocean energy to the energy system, with minimal impacts on health and the environment (notably biodiversity) and at the lowest possible cost.

Scope: The action implements the Strategic Energy Technology (SET) Plan implementation priorities[166] for ocean energy focussing on wave and tidal energy development. It will take into account the input defined in this context by the Implementation Working Group on ocean energy, the European Technology and Innovation Platform on ocean energy (ETIP Ocean)[167] and the European Energy Research Alliance (EERA) joint programme on ocean energy[168].

The overarching objective is the development and demonstration of cost-effective wave and tidal energy systems that can survive in a harsh ocean or sea environment. The challenge is open to proposals seeking to steer wave and tidal energy development for different type of resources in an effective way at a European level and to bring these technologies to the market. In this action the following can be considered:

- The development and demonstration in controlled environment of innovative wave energy devices.

- The development and demonstration in controlled environment of innovative next generation tidal energy devices

- The development and demonstration of new sustainable materials in ocean energy converters, moorings and foundations whilst ensuring structural integrity, durability and circularity can be considered.

- The development and demonstration of sustainable tailored mooring and connection of electrical or other power transmission systems (cable system, electrical equipment, ...) for wave and tidal energy devices. Advance combined mooring and electrical connectors or hydraulic power transmission to reduce component cost and number of connection operations, included in systems for sharing an anchor between devices in arrays. Develop novel systems for safe and quick connection/disconnection that do not require large vessels and/or diving teams.

166 See for instance: Ocean Energy - European Commission and Homepage - Oceanset
167 ETIP | Home
168 See for instance: https://www.etipocean.eu/knowledge_hub/1738/

- The instrumentation for condition monitoring and predictive maintenance of ocean energy devices and structures. Apply recent advances in condition and structural health monitoring from other sectors to ocean energy. The use of Artificial Intelligence (AI) in ocean energy technology development.

- Advanced manufacturing of ocean energy devices and structures and auxiliary equipment considering reduced energy, manufacturing costs and materials consumption, high production throughput and optimization of logistics.

- Development of technologies and solutions for the installation, maintenance and decommissioning of wave and tidal energy devices.

The validation and demonstration of new ocean energy technologies should be done in a controlled environment meaning that this is done under monitored and reproducible conditions, using for instance, test rigs and test tanks, semi-enclosed basins, or dedicated real-sea demonstration sites with instrumented monitoring infrastructure.

Structure, breakdown of activities and budget allocation

The action consists of activities directly implemented by the main consortium and of activities implemented through financial support to third parties. The latter can include cooperation with the activities undertaken by the beneficiaries of the EU grant and may complement them. The R&I activities are divided into three challenges:

1. Breakthrough challenge
2. Validation challenge
3. Demonstration challenge

The breakthrough and the validation challenge can be carried out both through activities directly implemented by the core consortium and through FSTP activities. The demonstration challenge will solely be implemented by the core consortium.

The breakthrough challenge entails actions to develop new solutions, tools and new knowledge to increase the competitiveness of the ocean energy sector and on the acceleration of ocean energy deployment at scale. The aim is that the innovative technologies will be validated at TRL 6 towards the end of the project. FSTP has to be used for engaging entities, start-ups and scale-ups which couldn’t be identified in the proposal phase.

The validation challenge entail actions to validate technologies, tools and innovative solutions at TRL 6 which have been developed in the project or have been developed previously or separately in other European and national projects. FSTP has to be used for new illustrative application use-cases demonstrating well defined added value to end users.

In the demonstration challenge the consortium is expected to carry out demonstration activities (up to TRL 7) in line with the priorities set by the SETplan ocean energy implementation plan

and accelerate the take up of innovation by the industry. The demonstration activities will be selected using the stage gate approach developed by the IEA OES task 12.

Activities directly implemented by the core consortium

The activities of the core consortium include the implementation of direct research and innovation activities in any of the areas listed in scope and in any of the challenges (breakthrough, validation, demonstration). The core consortium will be responsible for the management of the whole project, including the actions carried out through financial support to third parties (management of the FSTP calls, management of the FSTP projects).

It is expected that the budget dedicated to the project management will not exceed 7% of the EU funding.

The project must implement at least 3 demonstration activities. The focus of each demonstration activity should be clearly different from each other. Each demonstration activity must include a clear go/no go milestone before entering the deployment phase. Before this go/no-go milestone, the project has to submit i) proof of solid engagement of the industrial demonstration party, ii) all needed permits for deployment, iii) credible and detailed engineering plans, and iv) a complete business and implementation plan. The project proposal is expected to present a clear and convincing pathway to obtain necessary permits for the demonstration actions and allow for appropriate timelines to achieve these. The project is expected also to demonstrate how it will get a financial close for the whole action. For this the use of other EU/national/regional support mechanisms can be considered.

With the help of independent experts, the granting authority will assess all deliverables and give a go/no-go decision on the demonstration projects.

The total maximum amount of EU funding for the activities in the demonstration challenge is 25 million Euros.

Activities implemented through Financial Support to Third Parties (FSTP)

A share of the EU funding will be implemented through financial support to third parties and used to engage research organizations, academia, start-ups, scale-ups, SME's, industries and other entities and to enable use-cases that are not yet identified in the proposal stage.

The use of financial support to third parties should allow a faster implementation of research and innovation activities, and to respond to disruptive developments, attracting different stakeholders and innovators. A tiered approach to address complex R&I challenges should be adopted via FSTP calls, meaning that projects with a relatively short duration should be supported (e.g. 12-18 months). A given action supported by FSTP can be implemented by one third party or a by a (small) consortium of entities. Subsequent FSTP calls can be used to give further support to successful projects initiatives. The calls should be planned carefully and ensure that successful R&I work can continue without major interruption.

The FSTP calls will relate to the breakthrough challenge and the validation challenge.

- Breakthrough challenge: The consortium should run consecutive FSTP calls for the development of breakthrough technologies and innovative solutions in support of demonstrating and upscaling wave and tidal energy considering the full supply chain. Up to 3 million EU funding should be used to set up this 'Breakthrough technologies' challenge for third parties. Identify new partners (academia, SMEs, scale ups) and solutions to be then validated.

- Validation challenge: The consortium should run consecutive FSTP calls for the validation and demonstration of innovative technologies/solutions developed in the breakthrough challenge or from earlier R&I projects up to TRL 6. Up to 6 million EUR EU funding is expected to be used for subsequent FSTP calls.

The first FSTP call for the breakthrough challenge should be published in the first year. The FSTP call for the validation challenge has to be planned in a later stage enabling the use of the results of the breakthrough challenge and/or the core R&I activities.

The activities carried out through FSTP calls can pertain to any of the research and innovation areas listed in scope. The applicants must clearly describe in their proposal the objectives and the expected results of the FSTP call.

The FSTP call should comply with the EC guidelines on FSTP[169]. and fulfil the following:

– projects must publish their open calls widely and adhere to EU standards of transparency, equal treatment, conflict of interest and confidentiality;

– all calls for third parties and all calls that are implemented by third parties must be published on the Funding & Tenders Portal, and on the beneficiaries' websites;

– the calls must remain open for at least 2 months;

– if submission deadlines are changed, this must immediately be announced and registered applicants must be informed of the change;

– projects must publish the outcome of the calls without delay, including a description of third-party projects, the date of the award, the duration, and the legal name of the third party and country of establishment;

– the calls must have a clear European dimension.

Governance of the project

The action will require a strong internal governance and strong procedures. The project must define the overall governance of the project establishing how the detailed R&I priorities to be supported are defined and executed. In the project proposal, the consortium will have to describe a detailed work plan for the whole duration of the project, including the activities to be carried out directly by the core consortium and the ones carried out through financial support

169 European Commission (2025), Good practices for implementing financial support to third parties (FSTP) in EU grants.

to third parties (FSTP). It will have to set out how and the calls for proposals to be funded through financial support to third parties (FSTP) are organised and how the evaluation of these proposals is carried out.

The core consortium must demonstrate proven experience in sound financial management of large projects, including public procurement and/or calls and grants to support third parties, in particular for the beneficiary which will run the FSTP calls.

The project must, for all the research and innovation area covered, embed mechanisms to assess and demonstrate progress following the stage gate metrics developed by Task 12 of the IEA Ocean Energy System Technology Collaboration Platform (with qualitative and quantitative KPIs, benchmarking and progress monitoring, as well as illustrative application use-cases demonstrating well defined added value to end users) and share communicable results with the European R&D community. The evaluation framework has already been introduced by the Europewave PCP action.

The consortium will have to present a clear risk and mitigation plan. In this plan special attention should be paid to the risk that the chosen demonstration actions will not reach a go-decision.

To react quickly on scientific and technological developments in the sector and to increase the impact, the core consortium will provide as a project deliverable every year to the granting authority an assessment of the progress of all R&I activities, should there be the need to stop eventual unsuccessful activities and partially redirect their actions. As a part of this deliverable, the project will confirm in detail the activities to be carried out for the next year, the objectives, the budget and the respective implementation modalities, namely what are the activities carried out directly by the main consortium and what are the ones implemented through financial support to third parties (FSTP). ~~.~~ Besides defining and tracking progress of technology-specific KPIs in the technology areas specifically covered, the project will monitor and report on the contribution towards the high-level SET Plan KPIs defined by the SET Plan community in the ocean energy sector. [170] These annual reviews will be defined as milestones of the project and, as such, they will be subject to the approval of the granting authority.

The project sets up an Advisory Board, composed of experts in ocean energy systems' research and innovation, representing public and private entities that are third parties to the beneficiaries of the project. A representation of the SET Plan Implementation Working Group (IWG) on Ocean Energy and of the European Commission should be as well part of the Advisory Board. The consortium will ensure that the advice of the Advisory Board is appropriately taken into account in the project's implementation. This will be monitored by the granting authority.

The consortium should define measures to maximise the impact of the successful project and for that will contribute to the relevant Knowledge Community and Impact Network of the Clean Energy Transition Partnership and share communicable results with the European R&D community.

170 Ocean Energy - European Commission

When the activities carried out are covered by relevant initiatives under the International Energy Agency Technology Collaboration Programme on Ocean Energy Systems (IEA TCP OES) the projects must liaise with these initiatives to consider possible synergies, cooperation and mutual sharing of knowledge.

Proposals are encouraged to consider, where relevant, services offered by European research infrastructures[110], especially the Marinerg-i distributed infrastructure specialising in sea applications., as well as related projects offering access research infrastructures in the ocean energy applications, such as RISEnergy[111].

Duration

The estimated project duration is around 5 years.

HORIZON-CL5-2027-02-D3-11: Renewable Energy Valleys in Africa to increase energy security and energy access in Africa

Call: Cluster 5 Call 02-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 4.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 9.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). The following additional eligibility criteria apply: At least two legal entities established in at least two different African Union member states must be part of the consortium.
Technology Readiness Level	Activities are expected to achieve TRL 7 by the end of the project – see General Annex B. Activities may start at any TRL.
Award criteria	The criteria are described in General Annex D. The following exceptions apply:

	The following additions to the general award criteria apply: For the criterion **'Quality and efficiency of the implementation'**, in addition to its standard aspects, the following aspect shall constitute a major element: Demonstrated access to necessary land and / or permits for operation at the time of application and / or convincing risk management regarding delayed availability of land or permits. Risk management can include go / no-go decisions at mid-term.

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

- Strengthening of the joint EU-AU Climate Change and Sustainable Energy Collaborative Partnership efforts, with emphasis on improving the visibility of EU Science Diplomacy actions in Africa.
- Acceleration of the achievements of the African countries' targets of the Paris Agreement.
- Increase the roll-out of local or regional renewable energy system solutions for electricity, heat and fuel needs and contribute to a fair trade between Africa and Europe.
- Create new sustainable silks and jobs linked to local or regional renewable energy system value chains and enhance economic growth in local or regional African communities.
- Increase the readiness, reliability, performance and affordability of local or regional renewable energy system solutions in Africa.

Scope: Renewable energy valleys are understood as decentralised renewable energy systems that offer a viable and efficient solution to the challenges mentioned above. For example, local production and consumption, reduced transmission and distribution losses thanks to the reliance on local networks for energy needs, greater operational flexibility and reduced dependence on expensive fuel imports all contribute to a higher energy autonomy, a more secure supply, and lower, more stable overall energy costs, including for individual citizens. In addition, this alleviates a part of the load on the centralised grid and avoids blockages by the capacity of the grid.

The action should cover either urbanised or rural contexts in Africa. It should contribute to providing sustainable renewable energy access and creating other socio-economic benefits, such as improved health, economic wealth, skills and jobs, while reducing the stress on the environment, notably on biodiversity, adopting a Water Energy Food Ecosystem (WEFE) Nexus approach and following methods of the circular economy.

Actions are expected to cover the design, construct, commission and operate the demonstration installation, including aspects of energy needs and energy consumption, of grid stability and grid reinforcement in the region concerned. Actions should also develop and implement a tailored value chain approach, identifying the most suitable manufacturing value chains, on the basis of the local context, local material supply chain(s) and local workforce, with the objective

of ensuring sustainable local economic development. A gender sensitive approach could further support the activities, taking into account diverse vulnerable relevant groups such as rural communities, and women.

African SMEs are expected to play an important role in the overall value chain and to contribute in the identifying the needs. Participation of EU private sector actors should also be encouraged in alignment with the priorities of Global Gateway Strategy. Actions should also include the identification of technical, vocational and educational needs of the workforce and propose relevant training and qualification activities. Actions should finally define a market and business strategy that could take into consideration funding from international financial instruments and development finance programmes to ensure impact through a quick and viable commercial take-up of the technological solution demonstrated.

Social innovation should be considered. The business plan is expected to include appropriate consideration of available financial support instruments (local, regional and/or international) to enhance the speedy market deployment of the solution. The aspects of regulatory environment and local communities' governance needs and/or impacts are also to be considered.

Proposals are expected to include a life cycle analysis showing the impact of the proposed solutions when compared to other technologies/solutions on the environment, on climate change targets and on the social and the economic dimensions, taking a cradle to grave viewpoint, encompassing the design and the operation phases. The life cycle analysis should take a cradle to grave approach. Proposals should adopt a circular economy approach. Whenever negative impacts have been identified, mitigations measures are expected.

As the demonstration installation will be located in Africa, relevant African partners have to participate in the implementation of the project. A balanced involvement in the activities of the projects of European and African partners will be considered an asset in the evaluation. Actions should also participate in and contribute to the African Union[171] - European Union collaborative research action on Climate Change and Sustainable Energy, in particular through cooperation/collaboration with the project LEAP-SE, ", www.leap-re.eu. Alignment with Global Gateway ongoing activities on renewable energy in Africa should be also prioritized, including the collaboration with EU Delegation and EU private sector actors in Africa.

Lesson learned from the implementation of European Renewable Energy Valleys projects should be considered. These projects are REFORMERS[172] and CRETE VALLEY[173].

Proven access to necessary land and / or permits for operation at the time of application and / or convincing risk management regarding delayed availability of land or permits are expected in the proposal.

171 "African Union member states" includes countries whose membership has been temporarily suspended.
172 https://cordis.europa.eu/project/id/101136211
173 https://cordis.europa.eu/project/id/101136139

HORIZON-CL5-2027-07-D3-12: Demonstration of hydropower technologies for efficient and forward-looking refurbishment of existing hydropower plants

Call: Cluster 5 Call 07-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 8.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 17.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). Subject to restrictions for the protection of European communication networks.
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [174].

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

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

[174] 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

- Enhancing the capacities of the hydropower fleet to contribute with variable renewables base load to a secure and stable electricity system, including by modernising grid integration and hydropower fleet control.
- Increase technology leadership, competitiveness and technology export potential of European hydropower industry.
- Address challenges of climate change adaptation for a forward-looking and stable operation of sustainable hydropower for the coming decades.

Scope: Demonstration of hydropower technology solutions which allow for efficient and forward-looking refurbishment of existing hydropower plants. Provided solutions must be socioeconomically and environmentally sustainable (including biodiversity) and provide a respective assessment. Issues which can be addressed are for example: Innovative design of turbines (and also draft tubes, nozzles and distributors) and generators, including innovative improvements based on future load cycles and extending their intended life time; new models and simulation tools for harsher operational conditions; digitalisation and artificial intelligence to advance instrumentation and controls and flexibility and to develop innovative operational strategies towards reduced O&M costs; transient aspect linked to new operating patterns of hydro plants to cope with climate changes and renewable base load; new materials for increased efficiency and resistance of equipment and increased performance, life time and resilience of infrastructure including e.g. phasing out of PFAS and mineral oils; low-GHG balance concrete; automated maintenance of metal hydropower turbines to reduce cost; operator hazards and reduce LCoE related to OPEX; Improving water uses resilience via integrated operations and management; simulation and forecasting tools for integrated risk and mitigation analysis for climate change adaptation and in response to extreme weather events by taking fully into account biodiversity requirements by targeting good ecological status and e.g. fish migration; water flows and sediment dynamics not hampering flexible hydropower production, innovative techniques for enhancing the life time of concrete structures and the overtopping safety of embankment and rockfill structures.

HORIZON-CL5-2026-03-D3-13: Long-lifetime and optimised use of materials in recyclable Ag and In-free Si PV modules (EUPI-PV Partnership)

Call: Cluster 5 Call 03-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 15.00 million.
Type of Action	Research and Innovation Actions

Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 5 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [175].

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. There is no PV lifetime definition, but manufacturers usually guarantee a 25-year lifetime with an expected degradation rate of 0.8% per year. Meanwhile, a surge in the number of end-of-life (EOL) PV modules is expected, of which crystalline silicon (c-Si) PV is the main type. It would therefore be beneficial to improve the eco-design and sustainability of silicon-based solar cells and modules, by reducing the use of Critical Raw Materials (CRMs), revalorising the use of recycled silicon waste, adopting recyclable/repairable module designs and extending their lifetime without compromising their reliability and durability.

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

1. Ultra-low carbon footprint and reduced environmental impact PV cells/modules through lifetime extension, Ag or In free, and with designs that allow recyclability and repairability;

2. 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;

3. Support the execution of the solar energy joint research and innovation agenda.

[175] 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

Scope: Proposals are expected to:

- Extend module lifetime up to 40 years with extreme weather resilience;
- Develop cell/module architectures/designs including recycled content, without In or Ag and without harmful substances (Pb, F, etc.) but without compromising their quality and reliability;
- Develop module designs with improved recyclability and repairability;
- Develop adapted testing methodologies and recycling standards;
- Provide technical solutions for PV module repair in the field to extend lifetime;
- Determine the environmental benefits of recycling precious metals.

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-CL5-2026-03-D3-14: Industrial processes and equipment for innovative, reliable and scalable tandem technologies (EUPI-PV Partnership)

Call: Cluster 5 Call 03-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 30.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B. Activities may start at any TRL.

Expected Outcome: The REPowerEU plan and the EU Solar Energy Strategy introduced targets for the deployment of solar PV amounting to 600 GWac by 2030. Complying with these targets will be crucial for the European Union to reach its climate targets and free itself from import dependency on fossil fuels and the costs this imposes on Europe's competitiveness in terms of high energy prices. The Solar Strategy also introduces a target, which has been enshrined into the Net-Zero Industry Act, to re-consolidate the European solar manufacturing sector and scale up European manufacturing capacity across the entire value chain to at least 40% of the EU's annual deployment needs, or 30 GW of annual capacity by 2030. Innovation is particularly important in the solar PV sector, which is characterised by a short technology cycle, where new technologies become mainstream in only a few years. Novel tandem technologies offer therefore the opportunity for innovative spin-offs or start-ups and scale-ups to manufacture and put on the market competitive and efficient PV products, strengthening the resilience of the EU PV value chain and thus reducing excessive dependencies and increasing security.

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

1. Increase the potential for commercialisation of tandem PV technologies creating a competitive technological know-how for the European PV industrial base;
2. Contribute to the objectives of the EU Solar PV Industry Alliance;
3. Support the execution of the solar energy joint research and innovation agenda.

Scope: Proposals are expected to:

- Demonstrate tandem technologies with similar lifetimes to Si and higher efficiencies (beyond the Si limits);
- Demonstrate interface and thin-film large scale engineering;
- Demonstrate production processes and equipment ready for large scale deployment.

Whenever the expected exploitation of project results entails developing, creating, manufacturing and marketing a product or process, or in creating and providing a service, the plan for the exploitation and dissemination of results must include a strategy for such exploitation. 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-CL5-2026-11-D3-15: Improved system design for innovative PV applications (EUPI-PV Partnership)

Call: Cluster 5 Call 11-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 30.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.
Procedure	The procedure is described in General Annex F. The following exceptions apply: 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 agriPV and at least also to one proposal that is the highest ranked within the area of offshore/nearshore PV, provided that proposals attain all thresholds.
Legal and financial set-up of the Grant Agreements	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) [176].

[176] 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

Expected Outcome: Agrivoltaics or the co-location of agricultural activity and PV electricity production is a novel form of PV deployment which could provide farmers with diversified revenue sources and ecological benefits, while reducing land use competition, siting restrictions or adverse impacts on biodiversity and agricultural production. Optimizing system designs and business practices will help to enable simultaneous land use creating synergy for both agriculture and electricity production; this can benefit farmers, lower PV costs and enable the European Union to reach the goals of the EU solar energy strategy.

Similarly, offshore/nearshore PV systems represent a tremendous deployment potential in Europe and globally, due to their advantages in conserving land resources and optimizing light utilization. However, prevailing technical challenges limit deployment in most sea conditions usually found in Europe.

Project results are therefore expected to contribute to some of the following expected outcomes, depending on the proposed system (agriPV or offshore/nearshore PV):

1. Harvesting of crops and photovoltaic electricity, providing sustainable solutions for energy production/use/efficiency, soil and biodiversity protection and water conservation.
2. Reinforce the European PV value chain, introduce new business models and open new markets for novel, bankable agri or offshore/nearshore PV systems.
3. Minimise the impact of PV on landscape/sea and environment exploiting its modularity and synergies of use. Promote offshore wind and PV co-location and system integration.
4. Significant improvement of designs that reduce both CAPEX and OPEX, maximize energy output and thus reduce LCoE.
5. Promote integrated and multi-dimensional policy design to overcome socio-technical challenges for agri and offshore/nearshore PV deployment.

Scope: Proposals must address only one of the two areas (agriPV or offshore/nearshore PV). They are expected to demonstrate:

- A comprehensive (system) modelling for an accurate and reliable energy yield assessment with comparable methodologies for biodiversity, plant-yield and quality in the case of agriPV, as well as power generation.
- Advanced system components and system concepts/architectures of adequate scale that minimise impact on land/sea/environment while maximizing energy output/optimising connection to the grid.
- Resilience and adaptation of the systems to climate change impacts (extreme events, or in the case of agriPV, changing agricultural practices and/or crops choices, etc.).
- Standardisation for module and structure design for these applications.
- Permitting process definition.

- System demonstrators of adequate scale (min 5 MW altogether) at different EU climate/sea zones.

Achieving societal acceptance and sustainability in agriPV development requires clarity in permitting procedures, promoting energy justice principles, mitigating agronomic risks, and balancing economic development with environmental conservation. These dimensions need to be addressed holistically with the involvement of policymakers, industry stakeholders, and local communities working towards a just and equitable deployment of agriPV. In the case of offshore/nearshore PV, aesthetic appreciation, as well as possible conflicts of interest related to water areas (with e.g., commercial shipping, fishing, sand extraction, military use, and recreational sailing) or colocation should be looked at.

Whenever the expected exploitation of project results entails developing, creating, manufacturing and marketing a product or process, or creating and providing a service, the plan for the exploitation and dissemination of results must include a strategy for such exploitation as well as 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 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.

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-CL5-2027-02-D3-16: Production technologies for solar photovoltaics beyond the state-of-the-art (EUPI-PV Partnership)

Call: Cluster 5 Call 02-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 12.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 36.00 million.
Type of Action	Innovation Actions

Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	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: The REPowerEU plan and the EU Solar Energy Strategy introduced targets for the deployment of solar PV amounting to 600 GWac by 2030. Complying with these targets will be crucial for the European Union to reach its climate targets and free itself from import dependency on fossil fuels and the costs this imposes on Europe's competitiveness in terms of high energy prices. The Solar Strategy also introduces a target, which has been enshrined into the Net-Zero Industry Act, to re-consolidate the European solar manufacturing sector and scale up European manufacturing capacity across the entire value chain to at least 40% of the EU's annual deployment needs, or 30 GW of annual capacity by 2030. Innovation is particularly important in the solar PV sector, which is characterised by a short technology cycle, where new technologies become mainstream in only a few years. Novel technologies offer therefore the opportunity to innovative start-ups and scale-ups to manufacture and put on the market competitive and efficient PV products, strengthening the resilience of the EU PV value chain thus reducing excessive dependencies and increasing security.

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

1. Increase the potential for commercialisation of innovative PV technologies creating a competitive technological know-how for the European PV industrial base;
2. Contribute to the objectives of the EU Solar PV Industry Alliance;
3. Support the execution of the solar energy joint research and innovation agenda.

Scope: Proposals are expected to demonstrate

- Solar cells/modules with conversion efficiencies beyond those commercially available and degradation/reliability and performance at least on par with the most reliable commercially available technologies;
- A multi-MWp-ready resilient, energy efficient, defect-free production technology for cells/modules;
- Production equipment & pilot line, including digitalised and automated processing.

Whenever the expected exploitation of project results entails developing, creating, manufacturing and marketing a product or process, or in creating and providing a service, the plan for the exploitation and dissemination of results must include a strategy for such

exploitation. 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-CL5-2027-07-D3-17: Industrial scale up and circularity pathway for IPV technologies (EUPI-PV Partnership)

Call: Cluster 5 Call 07-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 33.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B. Activities may start at any TRL.

Expected Outcome: Integrated PV (IPV) technologies represent specific production challenges, notably linked to the greater diversity of IPV products in terms of format, shape, material and technical constraints. While IPV technologies represent a major opportunity for the European energy transition, unlocking a greater potential for solar PV, it is challenging to bring new products to the market due to the lack of availability of suitable infrastructure to demonstrate technically and economically innovative technologies at scale. In addition, as IPV components are not as standardised and present much greater technological, material and size variability than conventional modules, dedicated recycling and material recovery processes need to be demonstrated.

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

1. Increase the potential for commercialisation of IPV technologies creating a competitive technological know-how for the European PV industrial base;
2. Increase recyclability and minimise the environmental impact of IPV;
3. Introduce new business models and open new markets in IPV manufacturing, reuse and recycling;
4. Support the execution of the solar energy joint research and innovation agenda.

Scope: Proposals are expected to demonstrate

- Suitable IPV manufacturing, technically and economically innovative technologies at scale;
- Flexible IPV production pilot lines to test the 100kWp+ scale (with linked demonstration sites);
- Demonstration of recycling processes for various sizes, materials and technologies of IPV products (BIPV/IIPV, agriPV, VIPV, floating…).

Whenever the expected exploitation of project results entails developing, creating, manufacturing and marketing a product or process, or in creating and providing a service, the plan for the exploitation and dissemination of results must include a strategy for such exploitation. 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-CL5-2027-07-D3-18: PV based electrification of the economy: Designing & optimising PV systems supporting industrial electrification and promoting participation in electricity markets (EUPI-PV Partnership)

Call: Cluster 5 Call 07-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 18.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [177].

Expected Outcome: Large PV systems such as utility scale PV are evolving towards higher voltage architecture (>=3kV) with the objective to minimize losses and improve system efficiency at lower costs. The intention is to integrate also storage into such (hybrid) PV systems offering flexibility. It is consequently essential to build a blueprint for the implementation of high voltage large PV systems and the development of Direct Current (DC) networks around strategic end users for high voltage demand (industrial sites, servers, electric vehicle charging stations…). Understanding the factors that influence the performance and economics of these system architectures will help system planners evaluate the potential benefits of such hybrid resources that could support an increasing future industrial electrification. Another crucial challenge to address in ensuring the continued growth of new investments in solar PV, is the increasing occurrence of zero or negative prices in the electricity market, which dramatically hurt the profitability of operating solar PV assets. To tackle this challenge, PV participation to ancillary services is a way forward, which would reduce significantly system operating costs

[177] 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

and PV curtailment and improve system reliability and PV profitability. The coupling/pooling with other generation assets or storage/demand assets is also to be considered.

Project results are expected to contribute to all of the following expected outcomes as indicated for the proposed scope (high voltage DC PV systems or PV participation in electricity markets):

Scope 1: High-voltage DC PV systems:

1. Highly efficient PV systems, optimal utilisation of generated PV electricity, energy savings;
2. Decreased levelised cost of electricity (LCOE) and affordable electricity for industrial users.

Scope 2: PV participation in electricity markets:

1. Increased social profitability of PV by participation to ancillary services;
2. Energy efficient, cost competitive and flexible contribution of PV systems to the energy markets.

All proposals are expected to support the execution of the solar energy joint research and innovation agenda.

Scope: Proposals are expected to cover at least one of the following scopes:

Scope 1: High-voltage DC PV systems:

- Design higher voltage system architectures and evaluate the efficiency benefit;
- Develop the blueprint for an AC (Alternating Current)/DC hybrid solution for managing end user loads, achieving high levels of efficiency;
- Demonstrate a high voltage >3kV operating in DC grids for industrial installations hybrid system;
- Investigate the impact of higher voltage on PV modules.

Scope 2: PV participation in electricity markets:

- Demonstrate integrated management of PV generators for dynamic and/or nodal pricing;
- Pool PV with other consumption/production assets to participate in balancing mechanisms; assess the viability of these systems and demonstrate business models and financing schemes;
- Demonstrate reliability, procurement driven risk mitigation and better system availability through digitalization.

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Whenever the expected exploitation of project results entails developing, creating, manufacturing and marketing a product or process, or in creating and providing a service, the plan for the exploitation and dissemination of results must include a strategy for such exploitation as well as 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.

Energy systems, grids & storage

Proposals are invited against the following topic(s):

HORIZON-CL5-2026-03-D3-19: Grid-forming capabilities for more resilient and RES-based electricity grids

Call: Cluster 5 Call 03-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 20.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 6-7 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 the following expected outcomes:

- Improved preparedness of the electricity grids 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% by 2030 and full decarbonisation by 2050;
- Increased resilience and flexibility of electricity grids, which are able to better manage high shares of variable renewable energy systems (RES);
- Transmission system operators (TSO) and Distribution system operators (DSO) develop and use modern procedures and techniques for maintaining grid stability and secure operation;
- Seamless integration of power electronics-interfaced devices (PEID) in modern grids.

Scope: Projects are expected to address all the following items:

- Develop new and improved knowledge and insights into the synthetic inertia, frequency control, very fast voltage support, and overall support to the system stability offered by grid-forming inverters (GFIs). Develop and/or update relevant models and simulation tools;
- Develop and demonstrate innovative grid control and grid-forming solutions that leverage the capabilities of GFIs with the view to enable mass deployment of GFIs;
- Address use cases for both transmission- and distribution-level grids, ranging from applications used in residential and commercial domains up to the use in large RES generators (PV or wind) and grid-scale battery storage systems. They could also consider solutions that include LVDC microgrids that are connected to the main AC grids;
- Take a system-wise approach, including control strategies that can effectively encompass wider areas;
- Develop interoperability between different solutions and products from different GFI manufacturers. Devise standardised approaches through the use of hardware in the loop and advanced simulation models for GFIs;
- Leverage modern solutions, including digital twins and artificial intelligence. Use and/or develop, to the greatest extent possible, open-source software solutions and or software modules.
- Develop a manual and propose best practices on this matter to be used by TSOs and DSOs. Propose sets of standardised technical requirements for GFIs, test models and procedures for verification of compliance (for the use of TSOs and DSOs) Identify remaining gaps and further needs for research and development. Suggest market conditions and/or opportunities that would incentivise the deployment at scale of GFIs.

The demonstration, test and validation of the activities must be carried out in at least two pilots in different EU Member States or Associated Countries. The pilots are expected to address diverse solutions (including voltage levels and geographical landscapes).

Projects are expected to include at least: one electricity TSO, two DSOs, one provider of technology that includes GFIs, one RES-based energy producer, and one university and/or research organisation.

Additionally, collaboration is encouraged with:

- one or more suppliers of GFIs, with the aim to cover the whole range of products intended to be connected to both transmission and distribution voltage levels;
- at least one grid-scale battery storage system operator
- at least one aggregator that manages distributed energy resources that include GFIs.

This collaboration (minimum number of entities) is sought per project in total and does not necessarily apply per each pilot in particular.

Selected projects are expected to contribute to the BRIDGE initiative[178] and actively participate in its activities.

Proposals are encouraged to consider, where relevant, services offered by European research infrastructures[179], as well as related projects offering access to research infrastructures in the electricity grid domain- particularly RISEnergy[180].

International cooperation is encouraged, especially with Mediterranean countries other than the EU and with Latin America and the Caribbean.

HORIZON-CL5-2026-03-D3-20: Affordable and sustainable primary equipment for Future-Ready multi-terminal HVDC Systems

Call: Cluster 5 Call 03-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of between EUR 4.00 and 12.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 24.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply:

178 https://bridge-smart-grid-storage-systems-digital-projects.ec.europa.eu/
179 The catalogue of European Strategy Forum on Research Infrastructures (ESFRI) research infrastructures portfolio can be browsed from ESFRI website https://ri-portfolio.esfri.eu/
180 RISE Energy- Homepage -

	If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [181].

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

- The **expansion of High Voltage Direct Current (HVDC) infrastructure** across Europe is facilitated and supports the EU's energy transition through more performant, sustainable and affordable HVDC equipment that ensure higher grid reliability and stability.
- **Enhanced affordability and interoperability** of HVDC grid equipment.
- **Enhanced reliability and stability** of HVDC Grid, through developing advanced protection and control equipment.
- **Enhanced environmental sustainability** of HVDC equipment, by reducing their carbon footprint and enhancing their sustainability, e.g. through the development of SF6-free alternatives.

Scope: As Europe progresses towards sustainable energy, high-voltage direct current (HVDC) systems are vital for the efficient transmission of renewable energy. To optimize these systems, challenges like component size, reliability, affordability, interoperability, supply chain resilience and life-cycle environmental impact of critical HVDC equipment must be addressed.

To ensure the developed equipment is fit for use and interoperable, the consortium must include at least two equipment or system manufacturers, at least two transmission system operator (TSO) and at least two research centres.

[181] 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

The range of expected EU contributions specified in the table above is broad, because the types of equipment within the scope of the topic have by nature very different costs; therefore, the project costs and the expected EU contribution must be justified according to the scope of the project.

Projects must address all the following items:

- Investigate and **develop primary equipment** suitable for multi-terminal HVDC grids, that are small size, lightweight, environment-friendly (e.g. SF6 free, lead free), affordable and reliable, such as mechanical or hybrid (mechanical and solid-state) circuit breakers, fault current limiters, superconducting or conventional cables, conversion of high voltage alternating current (HVAC) overhead lines to HVDC ...
- Equipment **affordability and interoperability** are expected to be sought pragmatically, for example through modularisation, standardisation, focus on key functionalities and performances, size reduction, use of new components or new materials, …
- Conduct a comprehensive techno-economic **assessment of the system integration** of these technologies into multi-terminal HVDC systems.
- **Test, validate** performances in representative conditions, in relevant or operational environment".
- Contribute to **standardisation** bodies.

HORIZON-CL5-2026-03-D3-21: Hybrid AI-Control Framework for a next-generation grid-scale energy storage and system integration

Call: Cluster 5 Call 03-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 14.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).

Technology Readiness Level	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [182].

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

- Advanced digital twin and AI technologies (i.e. hybrid) to support proactive grid storage management and an effective integration with energy and ancillary services markets, for systems with high levels of renewable energy.
- Optimized energy storage operations resulting in reduced operational and ancillary service costs, extended asset lifespans and increased revenues from market participation while boosting renewable energy uptake for decarbonization.
- Optimized energy dispatch and storage cycling, increasing grid resilience and cost efficiency, aiding in lowering energy costs for consumers.

Scope: Projects are expected to develop and validate an integrated system that combines grid-scale energy storage with a hybrid AI control mechanism and optimisation within a digital twin framework. This system will enable proactive and adaptive management of storage and flexibility assets (e.g. large industrial plants with flexible electricity demand), ensure seamless integration with existing grid infrastructures (if applicable also with offshore systems) and electricity markets while enhancing system efficiency and resilience (also for rare/extreme events). The project will demonstrate real-time management for optimal energy dispatch, ancillary services and storage cycling, develop a scalable integration framework for seamless cross-border operability, and validate improvements in grid reliability through field demonstrations and simulations, providing a potential blueprint for EU-wide deployment. Proof of concept studies using PHIL technology applied to scaled systems are expected to be used for the proactive and adaptive management algorithms.

[182] 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

Selected projects are expected to contribute to the BRIDGE initiative [183] and actively participate in its activities.

HORIZON-CL5-2026-03-D3-22: Novel solutions for off-grid storage of renewable energy for critical infrastructures

Call: Cluster 5 Call 03-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 12.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). Subject to restrictions for the protection of European communication networks.
Technology Readiness Level	Activities are expected to achieve TRL 4-5 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [184].

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

184 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

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

- Enhanced European knowledge and leadership in off-grid clean energy storage technologies.
- Improved energy security and cost-effectiveness of Europe's energy systems, particularly for critical infrastructure.
- Elimination of fossil-based backup solutions for critical infrastructures, strengthening European competitiveness.

Scope: The topic aims to develop novel, cost-efficient off-grid energy storage solutions for renewable energy, tailored for critical infrastructures such as hospitals, transport hubs, data centres, and utilities. Solutions should address challenges specific to off-grid or non-interconnected area contexts, including storage scale, compromised grid interaction, resilience to potential shortages of critical materials, and multi-energy needs (electricity, heating, cooling). Emphasis should be on robustness and error-freeness, while considering sustainability, efficiency and performance. The project should foresee these solutions for using real-world critical infrastructures through simulation and experiments and establishing a procedure for decision-making, focusing on energy security and resilience against high-impact, low-probability events, by ensuring operational efficiency both on-grid and off-grid. Where relevant, interdependencies among critical infrastructures and system redundancy should be considered.

Projects are encouraged to support the reconstruction of Ukraine by including Ukrainian beneficiaries.

HORIZON-CL5-2026-03-D3-23: AI-driven forecasting algorithms for Grid and Consumer friendly Energy Sharing – Societal Readiness pilot

Call: Cluster 5 Call 03-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 12.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply:

	If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [185].

Expected Outcome: Projects are expected to contribute to all the following expected outcomes:

- Develop and test AI-driven forecasting algorithms that use machine learning processes to optimise the value of collective self-consumption through energy sharing for communities and citizens
- Upscale AI tools and models for grid balancing and forecasting to ensure consumer participation in a distributed energy system.
- Analysis of social interactions using advanced methods like game-theoretic models to highlight the role of active consumers and communities in energy systems.
- Deeper understanding of the needs and concerns of diverse social groups involved in or potentially affected by the R&I development of the technology, thereby increasing the potential for beneficial societal uptake and building trust in results and outcomes.
- Improvement of operation and maintenance of the grid and distributed assets.

Scope: AI-driven forecasting algorithms and machine learning can optimize bidirectional energy transfers involving flexibility services that can help energy communities and jointly acting customers evolve in their role as active participants in the energy system, while ensuring the reduced burdens on DSOs and residual suppliers. Innovations in machine learning forecasting can help balance energy systems and enable active participation in a decentralized, resilient, and digitalized European energy landscape, optimizing self-consumption and reducing energy costs for consumers.

[185] 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

This topic is a Societal-Readiness pilot:

- Proposals should follow the instructions applying to the Societal Readiness pilot, as described in the introduction of the Horizon Europe Main Work Programme 2026-2027 for Climate, Energy and Mobility. They entail the use of an interdisciplinary approach to deepening consideration and responsiveness of R&I 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.

Selected projects are expected to contribute to the BRIDGE initiative [186] and actively participate in its activities.

HORIZON-CL5-2026-11-D3-24: Data sharing to support the training and development of AI foundation models in the energy sector

Call: Cluster 5 Call 11-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 30.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	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: Projects are expected to contribute to all the following expected outcomes:

[186] https://bridge-smart-grid-storage-systems-digital-projects.ec.europa.eu/

- Effective and innovative methods for gathering, sharing and using large data sets in energy applications for the purpose of training AI models while ensuring privacy and security.
- Advanced and - wherever possible - open-source AI foundation models to support the digitalisation of the energy system, through improved grid observability, forecasting of supply and demand, advanced storage and renewables integration, demand side flexibility and energy efficiency.
- Enhanced cooperation, knowledge sharing and interoperability among energy system actors for secure and seamless data exchange.
- Advanced methodologies for AI model development ensuring that the results are FAIR (Findable, Accessible, Interoperable, Reusable) beyond the project ending, open source and accommodating for technology evolution.

Scope: The quality of AI models depends strongly on the amount, quality, and representativeness of the data used for their training. Projects are expected to focus on developing, training and testing AI foundation models, using extensive data sets to accelerate the energy transition in key focus areas of the energy sector. Projects are expected to:

- Building on the results of previously funded projects on the Common European energy data space[187] as well as the ongoing work within the Data 4 Energy expert group, projects are expected to demonstrate innovative methods and data governance strategies for sharing data among various energy actors. Projects are expected to demonstrate that they have access to large relevant datasets at the time of submitting the proposal.
- Projects are expected to develop innovative strategies for sharing data in an effective, secure and transparent way to support the development of AI foundation models. An indicative non exhaustive list of strategies that can be explored is the use of data space connectors or federated training of models to allow the integration of confidential data; the creation of synthetic data as an intermediate step to fill data gaps or improve the quality of the data could also be explored. Projects could also explore other innovative data sharing strategies, such as an 'AI gym'. The data governance strategies that will be developed in the project should be designed in a way to be scalable and operational even after the end of the project.
- Projects are expected to develop foundation models tailored for the energy sector, addressing at least one -or more- of the following use cases: planning and operation of electricity grids (including static power flow modelling and dynamic EMT modelling), forecasting, congestion management, anomaly detection, fault diagnosis, predictive maintenance, flexibility management, demand-side energy efficiency, smart and bidirectional charging of EVs or other use cases that contribute to the objective of digitalisation of the energy system.

[187] Establish the grounds for a common European energy data space

- Projects are expected to perform in-depth testing and validation of developed foundation models in lab demonstrators and real-life pilots, building on the results and using the facilities of previously funded projects on "AI testing and experimentation facilities (TEFs)" [188] . Regulatory sandboxes could also be considered for real-life pilot implementations.

- Projects are expected to bring together a wide group of stakeholders including data owners (for example energy utilities, grid operators, asset owners), application developers (for example startups, SMEs, hyperscalers) and model deployers (for example industry, grid operators, equipment manufacturers) providing a space of cooperation and collaborative data exchange.

- To scale up the training and development of the models, projects can benefit from the computing capacity of the AI factories that were recently announced by the European Commission[189], in particular the 3 AI factories that aim to develop AI applications for the energy sector.

- AI models are expected to respect ethical, safety and security principles; furthermore, transparency, explainability, and accountability should be embedded by design in the model development. Open-source development practices should be pursued wherever feasible. Efforts should be made to avoid biases, ensuring that the data produced is representative of diverse populations.

Selected projects are expected to contribute to the BRIDGE initiative [190] and actively participate in its activities.

HORIZON-CL5-2027-02-D3-25: Large scale operational validation and upscaling of state-of-the-art (Generative) AI tools and models powering a next generation digital energy system

Call: Cluster 5 Call 02-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 20.00 million.
Type of Action	Innovation Actions

188 AI Testing and Experimentation Facility (TEF) for the energy sector – bringing technology to the market
189 AI Factories
190 https://bridge-smart-grid-storage-systems-digital-projects.ec.europa.eu/

Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	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 expected outcomes:

- Advanced, secure frugal (energy-, resource-, data- and cost-efficient, sustainable) AI tools for real-time grid operations (including protection), market operations (if relevant) and consumer empowerment in distributed energy systems.
- A demonstrated AI development environment integrated with the upgraded digital spine of the energy system and energy-saving consumer applications.
- Scaled-up capabilities for learning at edge nodes and federated systems using agent-based architectures.
- A governance framework and operating model for the Gen(AI)-powered digital spine.

Scope: Building up on previous actions in Horizon Europe (e.g. the digital spine of the energy system) and Digital Europe (Common Reference Framework for energy consumer applications across the EU, Common Energy Data Space), projects are expected to:

1. Validate (demo site and operational grid) and scale secure state-of-the-art specialised frugal (energy- and resource-efficient, data- and cost-efficient, locally deployed and sustainable) open-source (Generative-)AI tools and models for real-time grid (and market, if relevant) monitoring, balancing, forecasting and consumer empowerment in a distributed energy system.
2. Demonstrate an AI development environment within the enhanced digital spine of the energy system, including its digital twin, which should incorporate the functionality of the Common Reference Framework for energy saving applications.
3. Prototype and validate at scale machine learning at the edge node level and federated at swarm level in an agent-based architecture, leveraging new mechanisms for scaling down AI models as well as incremental and reinforcement learning.
4. The project's deliverables should be compatible with the principles of the Common European Energy Data Space and consistent with the EU's Apply AI and Competitiveness Compass, ensuring that they promote AI adoption and competitiveness in line with EU policies, as well as the EU Digitalisation of the energy sector initiatives.

5. Where relevant and possible, the selected projects are expected to make use of the European AI factories and AI gigafactories.

6. The selected projects are expected, where available, to make use of and further develop commonly agreed European standards and to actively collaborate and contribute to the work of established and de facto European standards developing organisations and open-source communities and platforms.

Selected projects are expected to contribute to the BRIDGE[191] initiative and actively participate in its activities.

HORIZON-CL5-2027-07-D3-26: Advanced TSO control rooms to enhance grid observability, stability and resilience

Call: Cluster 5 Call 07-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 9.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 29.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). Subject to restrictions for the protection of European communication networks.
Technology Readiness Level	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:

- Enhanced reliability, resilience, and efficiency of electricity transmission grids. Grid congestion is managed efficiently;

[191] https://bridge-smart-grid-storage-systems-digital-projects.ec.europa.eu/

- Enhanced observability of grids and improved forecasting of supply, demand, grid capacity availability, and flexibility;
- Transmission system operators (TSO) leverage modern digital solutions and employ improved systems to effectively manage their grids and improve interoperability with other TSOs;
- Vendor-agnostic reference architectures, solutions and tools are developed to help advancing the TSO control room design and operation.

Scope: Projects are expected to address all the following items:

- Design and test innovative solutions, technologies and processes for advancing the way the TSO control rooms are designed and operated, increasing observability and entailing enhanced support for the operators, providing more automation and enhanced support for decision, faster response times and less room for error. The solutions are expected to incorporate both hardware and software aspects;
- Analyse and include, as far as possible, solutions for Wide Area Monitoring Systems (WAMS) to extend the real-time monitoring and control capabilities over large areas, while coping with the decentralisation and increased complexity of the system;
- The novel solutions are expected to help the operators to manage better grid congestion and incorporate more renewables while reducing curtailment. The solutions will facilitate data-driven grid operations, capitalising on real-time analytics and data from smart assets. The solutions may include preparation, recovery and/or restoration from incidents (including extreme weather events);
- Help the grid operators to update their operational tools in light of the deep transformation of the grids, notably the distributed nature of generation. May include the option to de-centralise the control for increasing the resilience of decision-making;
- Advance forecasting solutions for energy supply, demand and flexibility made available to the system operator, need for ancillary services, as well as for grid hosting capacity; provide advanced analytics and visualisations;
- Develop interoperability between the control rooms of different TSOs (and using different vendor solutions) to secure seamless data exchanges and coordination. Develop interoperability between the TSO control rooms and other entities connected to the transmission grids, including the adjacent DSOs.
- Leverage modern solutions, notably digital twins and artificial intelligence. Use security-by-design and advanced protection mechanisms against cyber threats. Use and/or develop, to the greatest extent possible, open-source software solutions and or software modules;

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- Develop a manual and propose best practices on this matter to be used by other TSOs (including operation instructions). Identify remaining gaps and further needs for research and development.

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

Projects are expected to include at least two electricity Transmission System Operators (TSOs) and at least two universities and/or research organisations.

Additionally, collaboration is encouraged with the following entities and projects:

- at least one supplier of technology and solutions for TSO control rooms;
- at least two distribution system operators, which manage grids that are connected to the grids operated by any of the TSOs that are partners in the project;
- (at least) one project funded under the separate call 'Advanced Distribution Management Systems (ADSM) for more efficient and flexible distribution grids' with the view to strengthen TSO-DSO coordination and support interoperable solutions. To that end, the project proposals are expected to describe a credible mechanism to do so.

This collaboration (minimum number of entities) is sought per project in total and does not necessarily apply per each pilot in particular.

Selected projects are expected to contribute to the BRIDGE initiative[192] and actively participate in its activities.

HORIZON-CL5-2027-07-D3-27: Advanced Distribution Management Systems (ADSM) for more efficient and flexible distribution grids

Call: Cluster 5 Call 07-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 9.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 29.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply:

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

	If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). Subject to restrictions for the protection of European communication networks.
Technology Readiness Level	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:

- Enhanced reliability, resilience, controllability and efficiency of electricity distribution grids. Congestion in distribution grids is managed effectively;
- Distribution system operators (DSO) leverage modern digital solutions and employ improved systems to effectively manage their grids and improve interoperability with TSOs and other DSOs;
- Vendor-agnostic reference architectures, solutions and tools are developed to help advancing the ADSM design and operation and effectively manage a broad range of grid services.

Scope: Projects are expected to address all the following items:

- Design and test innovative solutions, architectures, technologies and processes for advancing the way the ADSM are designed and operated;
- Provide ADSM software platforms that improve grid performance, controllability, and help integrating distributed energy resources (DERs) in an efficient way, while reducing congestion and improving grid flexibility;
- Advance forecasting solutions for energy supply, demand, and flexibility made available to the system operator; provide advanced analytics and visualisations;
- Advance interoperability, both with TSOs and other DSOs, as well as with the DERs at the edge of the grid;
- Leverage modern solutions, notably digital twins and artificial intelligence. Use security-by-design and advanced protection mechanisms against cyber threats. Use and/or develop, to the greatest extent possible, open-source software solutions and or software modules;
- Develop a manual and propose best practices on this matter to be used by other DSOs (including instructions to operate the system). Identify remaining gaps and further needs for research and development.

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

Projects are expected to include at least three Distribution System Operators (DSOs) and at least two universities and/or research organisations.

Additionally, collaboration is encouraged with the following entities:

- at least one supplier of technology and solutions for ADMS;
- at least one transmission system operator, which manage grids that are connected to the grids operated by any of the DSOs that are partners in the project;
- (at least) one project funded under the separate call 'Advanced TSO control rooms to enhance grid control and resilience' with the view to strengthen TSO-DSO coordination and support interoperable solutions. To that end, the project proposals are expected to describe a credible mechanism to do so.

This collaboration (minimum number of entities) is sought per project in total and does not necessarily apply per each pilot in particular.

Selected projects are expected to contribute to the BRIDGE initiative[193] and actively participate in its activities.

HORIZON-CL5-2027-07-D3-28: Integrated Approaches for Retrofitting Infrastructures with Innovative Energy Storage Technologies

Call: Cluster 5 Call 07-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 24.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).

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

Technology Readiness Level	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [194].

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

- Improved energy security of the energy system by offering cost-effective and efficient solutions for additional diverse and flexible energy storage capacities.
- Improve the sustainability and circularity of energy storage systems.
- Enhanced economic viability of energy storage by utilizing existing infrastructures.

Scope: Demonstration of novel or improved technological solutions for cost-efficient, circular and sustainable energy storage, which contribute to grid flexibility and make use of existing obsolete or outdated energy or other infrastructures. Proposals should integrate the synergies between novel or improved energy storage technologies and retrofitting of obsolete or outdated infrastructures, like e.g. old hydropower dams and basins, decommissioned power plants, former industrial facilities, coal mines, fossil fuel infrastructure etc. by optimizing at the same time storage capacity and efficiency as well as circularity and socioeconomic and environmental sustainability, which should be addressed, e.g. by stakeholder outreach and consideration of possible environmental impacts. Furthermore, proposals should follow secure by design approach and integrate built-in security in the energy systems.

Selected projects are expected to contribute to the BRIDGE initiative[195] and actively participate in its activities.

HORIZON-CL5-2027-07-D3-29: Community of practice - Data-Driven Decision-Making in Energy

Call: Cluster 5 Call 07-2027 (WP2026-2027)

[194] 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

[195] https://bridge-smart-grid-storage-systems-digital-projects.ec.europa.eu/

Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 6.00 million.
Type of Action	Coordination and Support Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). Subject to restrictions for the protection of European communication networks.
Legal and financial set-up of the Grant Agreements	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) [196].

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

- Enhanced knowledge sharing on data and analytics used for the planning and operation of European grids, and market integration;
- Better planning and simulation tools to support the development of electricity grids and integration of RES are made available to the research, academia, grid operators, and key actors in the energy value chains;

[196] 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

- New and innovative open-source solutions, software modules etc. are added to the existing and/or new repositories that support the development of grids and integration of high shares of RES;

- Improved EU-wide cooperation and coordination of actions on developing and utilising innovative data-driven solutions for energy, including AI-powered tools.

- Support to researchers and research organizations to maintain their research results FAIR (findable, accessible, interoperable, reusable) beyond research project ending and accommodating for technology evolution.

- Promotion of opensource practices and collaboration across the energy sector value chain to foster the industrialization of shared methods and standards in and by the energy industry.

Scope: Projects are expected to:

- Facilitate the coordination and cooperation of key actors in the energy value chains (e.g. grid operators, research and academia, providers of technologies and solutions, energy suppliers, providers of energy services traded on energy markets, representatives of consumers) to build a community of practice focused on developing and maintaining key tools and technologies for using data and analytics in planning, operating and maintaining the European electricity grids, while actively managing high shares of RES in the system;

- Involve, cooperate with, and/or build synergies with major European and international initiatives and groupings that are active in this field;

- Create a European ecosystem of innovation hubs that bring together key stakeholders in the energy sector to collaborate on digitalization projects, providing a space for experimentation and agile innovation;

- Showcase targeted cooperation between grid operators and research & academia for implementing specific projects and/or programmes;

- Build blueprints, methodologies, and repositories of open-source solutions for enhanced simulations, observation, forecasting, infrastructure asset management, and decision-making in energy with a view to reduce the overall costs of system operation;

- Promote the use of modern solutions, such as digital twins and AI-enabled systems.

Selected projects are expected to contribute to the BRIDGE initiative[197] and actively participate in its activities.

[197] https://bridge-smart-grid-storage-systems-digital-projects.ec.europa.eu/

Carbon Capture, Utilisation and Storage (CCUS)

Proposals are invited against the following topic(s):

HORIZON-CL5-2026-03-D3-30: Pre-commercial appraisal for CO2 aquifer storage

Call: Cluster 5 Call 03-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 25.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [198].

Expected Outcome: Project results are expected to contribute to the following outcome:

- Support pre-commercial CO2 geological storage appraisal, speed up storage site development, support planning of CO2 capture projects (and related source to store

[198] 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

linkages), and help closing the storage capacity gap, in particular in Central, Eastern and Southern Europe.

Scope:

- Carry out a storage site identification and appraisal programme including at least one injection pilot test in a deep saline aquifer. Injection tests can be done with water only to reduce cost and testing duration, although this could possibly (but not necessarily) be complemented by water with CO2 (or N2) to determine the reservoir injectivity with different phases.
- Cooperate with a national competent authority to ensure support in terms of the selection of the priority target formations and to have access to existing subsurface data. Demonstrate how the test site has been identified and that CO2 storage is legally possible in the designated area.
- Test sites must be in a saline aquifer at a minimal depth of 800 m, in a geologically stable area, with minimal faulting and fracturing, that provide significant scalable storage capacity (proven confinement, limited heterogeneity, and with favourable porosity and permeability and porosity), and are expected to gain the necessary permits, following the appraisal and testing. The geological conditions of the site should be defined in term of risks as it is in the Directive, that is, proposed site must demonstrate, in line with existing data, that prior analysis shows that, under the proposed conditions of use, there is no significant risk of leakage or damage to human health or the environment.
- Tests should be designed as to allow a reliable quantification of the injectivity index. Test duration should be optimised to achieve a representative pressure transient response.
- The Horizon Europe grant can support all data acquisition, processing and interpretation, modelling, the drilling, completion and logging of the test well, the injectivity test, and the measuring & monitoring technologies. These operations can be carried out by the consortium or be subcontracted.

This topic contributes to the R&I activity in the SET-Plan CCUS Implementation Plan[199] to unlock CO2 storage capacity through support to pre-commercial appraisal activities.

HORIZON-CL5-2027-02-D3-31: Advancements in Direct Air Capture

Call: Cluster 5 Call 02-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 8.50 million would allow these outcomes to be addressed appropriately.

199 06700519-1f0f-49b7-bd03-b9021e08fc1b_en

	Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 17.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 7 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [200].

Expected Outcome: Project results are expected to contribute to the following outcome:

- Accelerating the commercial availability of Direct Air Capture technologies.

Scope: Projects are expected to aim at scaling up existing technical solutions to *at least* the level of pilot demonstration in relevant environments (TRL 7 or higher).

Projects are expected to demonstrate:

- Improving the cost efficiency of the capture and regeneration process, including Balance of Plant;
- Improving material performance and process designs (e.g. capture/desorption capacity and kinetics, durability, long-term stability in air);
- Potential for manufacturing and scale-up (recycling and reuse of materials);

[200] 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

- Flexible operation under intermittent or surplus renewable energy supply.

Depending on the technology, other important issues to address are:

- Reducing energy use for sorbent/solvent regeneration;
- Alternative materials for - and approaches to - CO2 separation;
- Development and demonstration of materials in particular for DAC systems operating in cold temperatures or under humid conditions, or in areas with severe air pollution;
- Accuracy of simulated predictions compared to validation experiments;
- New designs for efficient, high-flux air contactors, optimised for maximum air contact.

Projects must develop a comprehensive life cycle assessment to evaluate the environmental implications of the entire DAC system, from material extraction and use, energy use and greenhouse gas emissions through to end-of-life.

The use of the European Research Infrastructure for CO2 Capture, Utilisation, Transport and Storage ECCSEL is encouraged but not mandatory.

International cooperation with participating countries of the Mission Innovation Carbon Dioxide Removal Mission[201] is encouraged.

HORIZON-CL5-2027-02-D3-32: Support to the implementation of an EU policy framework for CO2 transport and storage infrastructure

Call: Cluster 5 Call 02-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 5.00 million.
Type of Action	Coordination and Support Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).

[201] Carbon Dioxide Removal – Mission Innovation (mission-innovation.net)

Legal and financial set-up of the Grant Agreements	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) [202].

Expected Outcome: Project results are expected to contribute to the following outcome:

- Stakeholders involved in the CO2 infrastructure network are in a position to implement the upcoming legislative framework for CO2 infrastructure.

Scope: The project is expected to assist stakeholders involved in the CO2 infrastructure network in implementing the upcoming legislative framework for CO2 infrastructure.

Issues to address include market and cost structure, cross-border integration, interoperability and planning, technical harmonisation and investment incentives for new infrastructure, third-party access, along-chain liability, competent regulatory authorities, tariff regulation, ownership and contractual models, baseline of the state of play of current legislation on various aspects of the value chain.

As part of the deliverables, the project is expected to review and report on the current state of play concerning the challenges of repurposing existing infrastructure for CO2, also taking into account the infrastructure needs of renewable gases. Important issues to analyse include technical feasibility, costs, synergies between new (multimodal) CO_2 infrastructure and existing systems, regulatory barriers to integrating CO_2 infrastructure with industrial clusters, CO2 quality, flexibility, robustness, and interconnections between CO2 and energy infrastructures.

HORIZON-CL5-2027-07-D3-33: Delivery of industrial CCUS clusters – Societal Readiness pilot

Call: Cluster 5 Call 07-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.

[202] 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

Indicative budget	The total indicative budget for the topic is EUR 30.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	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 of the following outcomes:

1. Near-to-market solutions for the safe integration and use of CCUS technologies in the energy- and carbon-intensive industry;
2. A pipeline of projects that have the potential for commercial scale-up.
3. Deeper understanding of the needs and concerns of diverse social groups involved in or potentially affected by the R&I development of the technology, thereby increasing the potential for beneficial societal uptake and building trust in results and outcomes.

Scope: Projects are expected to be the de-risking first step to develop local or regional industrial CCUS clusters, i.e. (multi) source and (multi) sink solutions for the decarbonisation of the hard-to-abate industries of the region. Projects are expected to be the basis and orientation for future full-size projects. To maximise the impact, projects should have a substantial industrial involvement.

Projects should address most, but not necessarily all of the below issues:

- Detailed planning and preparation for retrofitting capture systems to existing industrial plants;
- Demonstrating important system components;
- Identification and characterisation of the clustering potential of (cross-border) regional CO2 emitters;
- Optimisation of industrial symbiosis between emitters and potential users of CO2;
- Development of tools to optimise the design and operation of the cluster(s) and operate CO2 streams with different compositions, flow rates and operating regimes to comply with the constraints for the shared transport and storage infrastructure;

- Identification of potential regional users of a common CO_2 infrastructure (this could also include enlargement counties, such as the Western Balkans, Ukraine and Moldova);
- Comprehensive economic and technical assessment to identify the best (multimodal) transport options, including the re-use of existing infrastructure;
- Development of business models for regional CO2 transport networks, including for dispersed industrial sites to link these to larger industrial clusters or pipeline networks;
- Consideration of feasible CO2 geological storage services
- Comprehensive set of studies and preparatory actions leading to permitting;
- Scenarios for integrating CO2 infrastructure in (plans for) regional, national and/or cross-border energy networks (electricity, hydrogen, natural gas), also in relation to future changes in industrial landscape and energy supply mix.

Projects are expected to deliver a strategy for the exploitation of results that includes plans for scalability, commercialisation, deployment, permitting procedures, and identified public and private funding sources for CAPEX and OPEX, like private equity, the InvestEU, the EU Catalyst Partnership, the Innovation Fund, and possibly the Regional Development policy funds.

For CO2 capture, transport, utilisation and (in particular onshore) geological storage, public acceptability is paramount. Therefore, projects are expected to identify and engage relevant end users and societal stakeholders (such as civil society organisations, non-governmental organisations, and local associations) in deliberative activities, so as to consider and respond to their needs and concerns.

This topic is a Societal-Readiness pilot:

- Proposals should follow the instructions applying to the Societal Readiness pilot, as described in the introduction of the Horizon Europe Main Work Programme 2026-2027 for Climate, Energy and Mobility. They entail the use of an interdisciplinary approach to deepening consideration and responsiveness of R&I 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.

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 energy performance of the European building stock is improved at an accelerated pace, contributing to the EU's energy security, while the buildings and the built environment have reduced climate and environmental impact throughout their life cycle.
2. The energy renovation and construction of buildings are cost-efficient, affordable and less disruptive.
3. The buildings are increasingly interacting with the users, energy system and their environment while operating in an integrated, resilient, secure, smart and flexible manner.
4. The buildings and the built environment are more climate resilient, accessible, inclusive and delivers multiple benefits which improve the quality of life, health and well-being for all users.

Industry

1. 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, notably through cost-effective electrification, use of renewable energy, heat recovery, thereby preserving / enhancing their global competitiveness.

Highly energy-efficient and climate neutral European building stock

Proposals are invited against the following topic(s):

HORIZON-CL5-2026-09-D4-01: Researching the technical, social & economic factors impacting the energy performance of Smart Buildings (Built4People Partnership)

Call: Cluster 5 Call 09-2026 (WP2026-2027)
Specific conditions

Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 16.50 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). The Joint Research Centre (JRC) may participate as member of the consortium selected for funding as a beneficiary with zero funding, or as an associated partner. The JRC will not participate in the preparation and submission of the proposal - see General Annex B.
Technology Readiness Level	Activities are expected to achieve TRL 4-5 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [203].

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

- Increased evidence of physiological, behavioural, social and cultural factors that influence different user groups and demographics on how they perceive and use smart, secured, integrated energy efficient systems, and how it affects the building whole-life cycle and energy savings, as well as occupant satisfaction, health and well-being;

[203] 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

- The design and operation of smart building systems and smart buildings are improved making them more user-friendly and effective.

Scope: Significant investments have been made in developing hardware and software for smart buildings. There is still limited understanding how smart buildings solutions impact the energy performance of buildings and users' comfort in practice. Research is required on the technical, social and economic factors that influence how different groups – defined by their social, educational, age, and financial status – use and interact with smart buildings and systems. The whole-life cycle impacts of smart building have to be better understood, from design and construction to operation, maintenance, end-of-life and circular re-use, to ensure delivery of sustainable and cost-effective smart building solutions.

Proposals are expected to address all of the following:

- Research and quantify how existing and novel smart building solutions meet the needs of different social and economic groups (based on their gender, age, educational and financial status, etc.);

- Identify major barriers and enablers for the use of smart building solutions among different socio-demographic and socio-economic groups, and research how it impacts the energy performance of buildings;

- Validate of findings in at least three different categories of existing buildings (e.g. private residential, social housing, commercial building, office building, etc.), each one in a different Member State or Associated Country.

- Develop actionable recommendations tailored to key stakeholders (such as equipment providers, architects, building owners and facility managers) to support the design, deployment and operation of inclusive, user-centric smart building solutions.

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.

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 contribute to the objectives of Built4People, transfer knowledge to its network of innovation clusters[204] and report on results in support of the monitoring of the Built4People KPIs.

Selected proposals could consider the involvement of the European Commission's Joint Research Centre (JRC) whose contribution could consist of scientific advice and technical analysis of solutions and technologies, support to the transfer of research output to standards,

[204] https://built4people.eu/b4pic_network/

and access to the European Laboratory for Structural Assessment research infrastructure for full-scale testing of buildings.

HORIZON-CL5-2026-09-D4-02: Low disturbance prefabrication approaches for deep renovation of multi-storey buildings (Built4People Partnership)

Call: Cluster 5 Call 09-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 28.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [205].

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

- Measurable reduction in the costs of deep renovation compared to current best practices;

[205] 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

- Measurable increase in resource and energy efficiency compared to current best practices;
- Measurable reduction in the number of days when occupants are disturbed due to renovation works;
- Measurable reduction of dust, noise, waste and pollutant and greenhouse emissions on the construction site compared to current best practices.

Scope: Meeting Europe's ambition for the renovation of the housing stock requires innovative approaches that improve buildings' energy performance and occupants' satisfaction, at a reduced cost while speeding up the renovation process and minimising impact on the construction site and disturbance for occupants. Renovation approaches should cover the whole workflow from design, off-site manufacturing and on-site installation to strategies for maintenance, operation and end of life.

Proposals are expected to address all of the following:

- Demonstrate cost-effective approaches (comprising design, planning and construction processes and techniques) for deep renovation to at least NZEB performance levels of multi-storey buildings (> 5-storeys);
- Ensure that the approaches make use of prefabricated solutions that are adaptable and can be seamlessly integrated into a variety of existing building elements and features (e.g. various existing wall materials, presence of balconies and overhangs, existing piping in the way, etc.);
- Ensure that the approaches minimise the disturbance for building owners, tenants and users, notably through a significant time reduction of on-site construction activities and of unavailability of the building and its main functionalities, and a minimal impact on occupancy comfort during the renovation;

Demonstrate the proposed approaches tailored to three multi-storey buildings (> 5-storeys), each in a different Member States or Associated Countries and covering different building categories (residential or non-residential). 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 contribute to the objectives of Built4People, transfer knowledge to its network of innovation clusters[206] and report on results in support of the monitoring of the Built4People KPIs.

HORIZON-CL5-2026-09-D4-03: Advanced data platforms to integrate whole life carbon in building information tools, assessments, and certification (Built4People Partnership)

Call: Cluster 5 Call 09-2026 (WP2026-2027)
Specific conditions

[206] https://built4people.eu/b4pic_network/

Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 16.50 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [207].

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

- Increased number of building information tools, assessments and/or certificates makes use of digital data exchange platforms;
- More accurate and reliable EU-aligned life cycle inventories of embodied environmental flows in construction materials and products;
- Increased number of already existing building standards and certification schemes refer to GWP to support national decarbonisation strategies in line with relevant European legislation (such as Energy Performance of Buildings Directive, Construction Products

[207] 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

Regulation and delegated acts, voluntary label for carbon footprint of steel, Delegated Act for carbon removal certification in long-lasting products);

- Improved data availability and interoperability for whole life carbon assessments across different building lifecycle stages.

Scope: The Energy Performance of Buildings Directive (EPBD) recast places an increased emphasis on addressing whole life carbon and the calculation of the global warming potential (GWP) of buildings as part of its holistic approach to enhancing building sustainability. Several projects have focused on developing data analytics tools to integrate building energy performance certificates (EPCs) with other tools like the Smart Readiness Indicator (SRI), Building Renovation Passports (BRPs), and Digital Building Logbooks into a unified framework or global information tool. More work is needed to integrate whole life carbon data in energy information tools to capture both operational carbon (energy used during the building's use phase) and embodied carbon (associated with extraction of raw materials, manufacturing, transportation, construction, and eventual disposal or recycling), as well as the (potential for) carbon removal in sustainably sourced construction products. On the other hand, more robust life cycle assessments based on more accurate and reliable national and international life cycle inventories of embodied environmental flows are needed to set up a solid construction digital product passport system.

Proposals are expected to address all of the following:

- Demonstrate digital data exchange platforms for buildings to enable the development of comprehensive building information tools, assessments and/or certificates. These platforms should incorporate a wide range of data from, for example, whole life carbon assessments, national/international databases of embodied flow coefficients for construction materials and products, Digital Product Passports, Energy Performance Certificates, Smart Readiness Indicators, Building Renovation Passports, and Digital Building Logbooks.

- Use advanced data analytics and wherever possible existing recognised data standards to exchange data and ensure the interoperability with real-time digital twins and BIM-based models.

- Validate the proposed platforms in at least three large scale pilots. These pilots must encompass a range of building types (such as residential, commercial, educational, etc.) and address diverse use cases (including energy monitoring, renovation optimization, etc.).

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 contribute to the objectives of Built4People, transfer knowledge to its network of innovation clusters[208] and report on results in support of the monitoring of the Built4People KPIs.

[208] https://built4people.eu/b4pic_network/

HORIZON-CL5-2026-09-D4-04: Validating policies and business models for affordable and sustainable housing (Built4People Partnership)

Call: Cluster 5 Call 09-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 15.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 4-5 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [209].

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

- Better understanding of the factors and interdependencies that influence levels of renovation of rental properties in the affordable housing sector;

[209] 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

- Increased number of policy makers revise policies, regulations, instruments and business models to increase the rate of renovation of rental properties in the affordable housing sector.

Scope: The Renovation Wave strategy sets out measures across the whole renovation chain that aim to increase the rate and depth of renovations. One of the key principles for housing renovation towards 2030 and 2050 is affordability, i.e. making energy efficient, comfortable, healthy, sustainable and climate-resilient buildings widely available, in particular for medium and lower-income households and vulnerable people and areas. A better understanding of the impact of current policy frameworks on the affordable housing sector and on energy poverty is needed.

Proposals are expected to address all of the following:

- Research the effectiveness and implications of existing policies at different levels of governance (from local to European), regulations, support instruments and business models on the renovation and provision of rental properties in the affordable housing sector.

- Validate a methodology for comparing the affordability of different types of rented properties located in different local housing markets, with different climate conditions, and for different demographic groups, including vulnerable ones;

- Design and validate new or improved solutions (policies, regulations, support instruments and/or business models) that improve affordability while still meeting decarbonisation targets for the housing sector. Quantify the effects of those solutions on the cost of a 'deep renovation' of rental properties in the affordable housing sector, considering the scale of the renovation (e.g. small multi-apartment buildings, large multi-apartment buildings; groups of buildings) and the type of governance and ownership models.

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 contribute to the objectives of Built4People, transfer knowledge to its network of innovation clusters[210] and report on results in support of the monitoring of the Built4People KPIs.

Projects resulting from this topic are encouraged to share information, best practice, and results with the 'New European Bauhaus hub for results and impact'.

HORIZON-CL5-2027-05-D4-05: On-site robotic and automated techniques for building renovation and new construction

Call: Cluster 5 Call 05-2027 (WP2026-2027)
Specific conditions

[210] https://built4people.eu/nebula_project/

Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 6.75 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 20.25 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). The Joint Research Centre (JRC) may participate as member of the consortium selected for funding as a beneficiary with zero funding, or as an associated partner. The JRC will not participate in the preparation and submission of the proposal - see General Annex B.
Technology Readiness Level	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [211].

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

- Improved resource efficiency compared to current practices;
- Improved accuracy (designed vs. as-built) of on-site renovation and construction works, compared to current best practices;
- Significant reduction in time spent by building professionals on site;

[211] 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

- Reduced GHG emissions at the construction site.

Scope: The rate of deep renovation of buildings can be accelerated by modernising the construction sector and embracing the latest developments in robotics and automated systems. There is need for further development of techniques using innovative on-site robotic and other automated systems that make renovation and construction works more sustainable, less disruptive, faster as well as more accurate, cost effective and resource efficient, while delivering, at least, the same building elements' energy performance compared to current best practices. Proposals are expected to address all of the following:

- Demonstrate innovative on-site robotic and automated techniques for building renovation and the construction of new buildings. At least one of the proposed techniques should involve 3D printing;
- Develop techniques that are specifically for building-site applications (e.g. solutions focusing on prefabrication in workshops/factories away from the building site are out oof the scope), flexible to adapt to various building typologies and, where possible, to materials and components already on the market;
- Ensure that the proposed techniques appropriately take into account aspects of on-site workers' safety and human-robot collaboration;
- Demonstrate the proposed techniques in at least three demonstrations to investigate their applicability for a variety of building typologies and climatic conditions, duly justified to represent a relevant part of the European building stock. Proposals must address the energy renovation of existing buildings but may also address new constructions.

Selected proposals could consider the involvement of the European Commission's Joint Research Centre (JRC) whose contribution could consist of scientific advice and technical analysis of solutions and technologies, support to the transfer of research output to standards, and access to the European Laboratory for Structural Assessment research infrastructure for full-scale testing of buildings.

HORIZON-CL5-2027-05-D4-06: Thermal energy optimisation and waste heat recovery of high energy demand IT rooms in buildings or small edge data centres

Call: Cluster 5 Call 05-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.25 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 15.75 million.

Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [212].

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

- Improved open access to performance data, sharing of best-practices and useful knowledge and information for owners and operators of IT infrastructure, as well as the IT and building sectors;
- New designs of IT rooms in buildings or small edge data centres valorise waste heat through thermal management techniques, processes and tools.

Scope: The growing energy needs of the ICT sector must be met while aligning with climate neutrality and sustainability goals. Small IT rooms or small data centres are an essential part of the twin green and digital transition. It is important to address the energy and resources consumption over the full ICT value chain. Solutions already exist, such as re-using waste heat from data centres, or moving towards circular models (longer lifetimes, reparability, reuse and recyclability). Most recent analysis suggests that the energy consumption of consumer devices in 2020 accounted for roughly 50% of the overall energy consumption of ICT technologies, with the two next largest contributors being respectively the production of ICT devices (~20%) and the operation of data centres (~15%)[213]. Moreover, this is expected to change dramatically by 2030, as the overall energy consumption of ICT technologies is expected to increase by 50%

[212] 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

[213] eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022SC0341

over this decade. The Commission has set the strategic goal of ensuring that data centres are climate-neutral, energy- and resource efficient by 2030. However, most efforts are directed towards data centres in scope of the Energy Efficiency Directive recast.

Proposals should address all of the following:

- Demonstrate state-of-the-art holistic and cost-effective approaches to thermal management and excess heat recovery (optionally including heat storage and/or upgrade of heat) and re-use in local or nearby site creating effective added value in existing IT rooms in buildings or small edge data centres (in the range of 100-500kW, not covered by Energy Efficiency Directive recast), taking into account thermal envelope/building (by means of simulation or digital twins, among others), integration with building automation and control systems and potential to improve the self-assessment and self-optimisation functionalities at all levels, and integration into existing BMS allowing for further development of energy services. Demonstrators should be located in both cold and warm climate Member State or Associated Country to tackle climate specific challenges of thermal management of waste heat.
- Develop business cases for state-of-the-art solutions for excess heat recovery & re-use (optionally including heat storage and/or upgrade), for example by re-using excess heat in an existing system in the building (such as heating or water production purposes), or in a local district heating and cooling network, or in any other local or nearby site creating effective added value to the recovered heat.

HORIZON-CL5-2027-05-D4-07: Integrating circularity in LCA-based modelling frameworks for renovation of buildings (Built4People Partnership)

Call: Cluster 5 Call 05-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 6.75 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 27.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).

Technology Readiness Level	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [214].

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

- Demonstration of measurable reductions in material flows, life cycle energy use and GHG emissions in building renovations that integrate circularity strategies to contribute to achieving net-zero whole life carbon buildings;
- More robust approach to current modelling frameworks to comprehensively reflect the complexity of circularity strategies in life cycle assessments at building scale.

Scope: European buildings are increasingly adopting circularity strategies in renovations to reduce life cycle environmental impacts and improve resource efficiency in response to the requirements based on current frameworks, such as Level(s) and WLC models used by Member States based and EN 15978 standard. The complexity of these circularity strategies, such as material reuse and recycling, and addressing the changing nature of assessed systems with long life cycles are critical for achieving more reliable assessment results. Further work is needed to advance and achieve more detailed modelling frameworks that integrate circularity assessment with life cycle assessment, supporting the delivery of net-zero whole-life carbon buildings.

Proposals should address all of the following:

- Develop a comprehensive modelling framework that integrates circularity assessment in life cycle, covering cradle to cradle system boundary;
- Apply the developed modelling framework to at least three real-life buildings in different climatic regions in different Member States or Associated Countries, for which renovation project developers have adopted ambitious circularity strategies to achieve zero whole-life carbon buildings. Circularity strategies should include reuse and/or recycle, as well as at least one of the following: reduce, repair, refurbish, remanufacture, and repurpose;

[214] 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

- Assess the embodied emissions (from materials, products, and construction processes) and operational emissions (from energy use for HVAC, DHW, electrical appliances, lighting) of the real-life buildings subjected to renovations during their entire life cycle, referencing life cycle stages in EN 15978.

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 contribute to the objectives of Built4People, transfer knowledge to its network of innovation clusters[215] and report on results in support of the monitoring of the Built4People KPIs.

Industry

Proposals are invited against the following topic(s):

HORIZON-CL5-2026-09-D4-08: Full-scale demonstration of heat upgrade solutions in industrial processes

Call: Cluster 5 Call 09-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 18.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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

215 https://built4people.eu/b4pic_network/

	for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025) [216].

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 industrial sector with a significant heating demand in the EU and Associated Countries develops pathways and business models to measurably increase the recovery and upgrade of locally available heat for covering process needs and significantly or totally phasing out of fossil fuel use, while preserving or enhancing its global competitiveness.

- Measurable improvement of renewable and/or industrial excess/waste heat recovery and upgrade solutions, possibly combined with thermal and/or electrical energy storage, in terms of energy efficiency, flexibility of electrical demand, climate and environment protection, reliability and safety, physical and cyber security, and profitability.

Scope: This topic aims to satisfy the need for process heat in the more industrial sectors by upgrading excess/waste heat from the process itself, possibly combined with heat recovered in nearby locations or local renewable heat, as a cost-efficient way to improve energy efficiency and reduce the GHG emissions and the use of fossil fuels. Thermal and/or electrical energy storage can be integrated, if it can contribute to better matching heat sources with process needs and/or to offer more flexible electricity consumption from the grid.

The temperature of the heat supplied to the process is not specified, but the proposals will be evaluated on their potential to enable the deployment of heat upgrade solutions in more sector(s) and process(es), where they are not yet state-of-the art.

Projects must address all the following items:

- Optimise and demonstrate physically within one or more operational industrial site(s), the transformation of process(es) in at least one industrial sector, by recovering excess/waste heat from the process itself, possibly combined with local renewable heat or heat recovered in nearby locations and local thermal and/or electrical energy storage, and by upgrading the heat (e.g. with heat pump) for use in the process(es).

- Maximise the replicability and deployment of the concept/solution in the EU and Associated Countries' plants in the same industrial sector. Already before starting the design phase, the needs of most EU and Associated Countries' factories in the same

[216] 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

industrial sector(s) should be surveyed and analysed in order to design a solution that can be adapted to meet most of them.

- Identify common components, optimise and define a standardised version of them.
- Develop open technical and economical guidelines and open tools for system design and business case development.
- In case the targeted industrial sector(s) and process(es) has/have been covered by the actions under the topic LIFE-2024-CET-HEATPUMPS[217], this proposal should build on the results of these actions and if possible cooperate with them, both for the definition of the solution to demonstrate and the dissemination channels.
- Disseminate results notably (but not only) to the relevant communities in cluster 4 'Digital, Industry and Space' private-public partnerships.

HORIZON-CL5-2027-05-D4-09: Demonstration of industrial excess/waste heat conversion to mechanical or electrical power

Call: Cluster 5 Call 05-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 14.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of	The rules are described in General Annex G. The following exceptions apply:

[217] https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/life-2024-cet-heatpumps

the Grant Agreements	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) [218].

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 industrial sector with a significant heating demand in the EU and Associated Countries develops pathways and business models to measurably increase the industrial excess/waste heat recovery and conversion to power.
- Measurable improvement of industrial excess/waste heat recovery and conversion to power, possibly combined with energy storage, in terms of energy efficiency, flexibility of electricity production, climate and environment protection, reliability and safety, physical and cyber security, and profitability.

Scope: Better use of process excess/waste heat represents a significant source of energy savings for industries. The conversion of excess heat back to electricity, would improve energy efficiency, mitigate the increase of electricity consumption due to industrial electrification, as well as offer flexible electricity generation to stabilise the grid, if combined with thermal and/or electrical energy storage.

Projects must address all the following items:

- Develop and validate novel excess/waste heat recovery and conversion systems.
- Demonstrate physically within one or more operational industrial site(s), the recovery of industrial excess/waste heat, possibly combined with energy storage, and its conversion to mechanical or electrical power.
- Maximise the replicability and deployment of the concept/solution in the EU and Associated Countries' plants in the same industrial sector. Already before starting the design phase, the needs of most EU and Associated Countries' factories in the same industrial sector(s) should be surveyed and analysed in order to design a solution that can be adapted to meet most of them.
- Identify common components, optimise and define a standardised version of them.
- Develop open technical and economical guidelines and open tools for integrating such systems into SCADA (Supervisory Control and Data Acquisition) and EMS (Energy

[218] 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

Management System) infrastructures of existing plants, and for developing innovative business model of heat valorisation as a flexible electricity generation offered to stabilise the power grid.

- Disseminate results notably (but not only) to the relevant communities in cluster 4 ‘Digital, Industry and Space’ private-public partnerships.

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. Accelerated uptake of a zero-tailpipe emission ecosystem, with interoperable technological solutions developed at system level (vehicles, infrastructure, user and energy grid) that support the global competitiveness of the EU transport and mobility system.
2. Zero-tailpipe emission mobility solutions developed that are affordable, efficient, user-friendly, inclusive, safe and circular with concepts and technologies that are easy to deploy, considering needs, behaviours and socio-economic conditions of all end-users.
3. Clean mobility solutions for a climate neutral and environmentally friendly and zero pollution mobility with a higher level of circularity;
4. Increased responsiveness of zero tailpipe emission vehicles and systems to diverse societal interests and concerns.

Aviation

1. Enable breakthrough technologies and innovations that will contribute to the design (addressing also eco-design and circularity principles), manufacturing, maintenance and operations of new generation aircrafts, also powered by renewable energy and sustainable aviation fuels, for a competitive and clean EU aviation ecosystem (including airports).
2. Derisk and accelerate the introduction of new digital technologies (with emphasis on AI) at all levels in the industrial aviation ecosystem, while addressing all safety-related issues in collaboration with the European Union Aviation Safety Agency (EASA).

Waterborne transport

1. Higher autonomy range in electric and hybrid vessels.

2. Uptake of renewable and low carbon fuels and improved knowledge on the suitability of innovative renewable and low carbon fuels and other energy carriers for waterborne transport.

3. Support the objectives of the European Port Strategy and Waterborne Industrial Strategy, contributing the role of ports as energy hubs, improving efficiency and safety through digitalization, improving the resilience and security of the transport network, as well as increasing the competitiveness of the industrial and technology EU capabilities.

4. Significant reduction of emissions from large vessels due to the merging of energy efficiency and renewable and low carbon fuels.

5. Sustainability of waterborne transport by design, considering air and water pollution, circularity and life-cycle assessments in shipbuilding.

6. Improved safety of seafarers, port workers and the environment.

Transport-related environment and health

1. 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-CL5-2026-05-D5-01: Large-scale demonstration of Heavy-Duty Battery Electric Vehicles (HD BEV) towards long-haul logistics operations (2ZERO Partnership)

Call: Cluster 5 Call 05-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 34.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 68.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of

	Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). Subject to restrictions for the protection of European communication networks.
Technology Readiness Level	Activities are expected to achieve TRL 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:

- Increased percentage of Heavy Duty Battery Electric Vehicles (HD-BEV) tested and used in operations by the logistics and transport operators involved in the demonstrations, compared to the current fleets.
- Demonstrated efficient integration of HD-BEV in logistics fleets and operations along several European corridor segments, building further on the initial fleet developed in the large-scale demonstrations and across several types of transport operators.
- Reinforced ecosystem connecting involved parties as fleet operators, charge providers, road authorities at local, regional, national and European levels – also reinforcing the industrial HD-BEV value chain in the EU.

Scope: The implementation of zero emission vehicles for long-distance heavy-duty freight transport is of key importance to meet the European targets reducing greenhouse gas and air pollutants emissions. To further accelerate HD-BEV integration in logistic fleets and operations it is essential to identify and address the remaining barriers and challenges of their deployment. These barriers can be related to e.g. limitations in vehicle technology, digital tools, knowledge and user awareness, stakeholder engagement, energy and power availability, charging infrastructure needs such as depot charging and Megawatt Charging System (MCS), permit processes and connection to the grid and services. The challenges for logistics companies' (also smaller operators) implementing zero emission transport solutions need to be addressed.

Proposed actions are expected to address all of the following aspects:

- Perform large-scale demonstrations of HD BEV equipped with MCS reaching up to a hundred market-ready vehicles and new generation vehicles in logistics fleets operations, involving several transport operators also engaging SMEs and microenterprises, focussing on long-haul operation (average ≥600km operations) during extended durations of over twelve months. The demonstrations must cover at least four European corridors' segments in at least four Member States (MS) and/or Associated Countries (AC), and involved HD BEV should where possible be also equipped with MCS connector.
- Identify and address the barriers and challenges to accelerate the deployment of fleets of HD-BEV in long-distance logistics operations in Europe, considering also the impact of battery degradation and the weather conditions in all seasons.

- Develop and integrate in the demonstrations the use of digital tools with use of AI, access to data sets, operational and governance logistics models including charging opportunities and models to facilitate increasing numbers of HD-BEVs in logistics operations

- Ensure synergies with the existing publicly accessible charging infrastructure available or funded under the CEF and/or other national/regional funding schemes and assess charging methods and business models for long-haul operations such as depot, destination, truck-stops, overnight etc., using different charging power considering cost and time optimisation. Only depot charging (mono and/or multi-operator) infrastructure can be (partially) funded in demonstration projects, including related innovative business models associated such as smart, bidirectional V2X solutions and possible second life of batteries.

- Develop a competition-compliant ecosystem for sharing data for HD-BEV fleet management in so-called data labs including data pooling, which can include publication of open and FAIR (Findable, Accessible, Interoperable and Re-usable) data, and which could build on the common European mobility data space, also supporting the dissemination best practices, learnings and capacity building mechanisms as levers for HD-BEV acceleration. Using the shared data, new services and tools can be developed, including AI-based tools, agents and model frameworks for fleet management, both for on-board and remote monitoring.

- Define and test use cases for the use of HD-BEV fleets in long-distance logistics operations for cross-border flows, operational strategies to shift freight transport demand to zero-emission solutions, and collaborative business model(s).

- Establish synergies and leverage with previous and ongoing projects related to HD-BEV and charging systems and with related forums, platforms and programmes, such as with the European Clean Corridors Initiative, as part of the Automotive Action Plan.[219]

- Map and assess how policies and relevant legislation (including incentives) can support an affordable transition to HD-BEV. Identify and address, by providing recommendations, remaining legal and regulatory barriers encountered in the demonstrations.

An analysis of the potential economic, social and environmental benefits (notably greenhouse gas and air pollutants emissions reduction) must be included in the demonstrations.

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.

[219] e.g.: Research projects - 2Zero Emission; Sustainable Transport Forum (STF) - European Commission, "European Clean Transport Corridor initiative" – Industrial Action Plan for the European automotive sector (COM(2025) 95 final).

HORIZON-CL5-2026-05-D5-02: Energy-efficient software-defined EVs (2ZERO Partnership)

Call: Cluster 5 Call 05-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 16.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 16.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). Subject to restrictions for the protection of European communication networks.
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [220].

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

- Demonstrated energy-efficient, electric Software Defined Vehicles (SDVs), with purposely developed and strategically positioned traction and chassis hardware (HW)

[220] 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

subsystems leveraging opportunities of the software (SW) abstraction layers as the cornerstone of SDV, and overall scalable.

- Real life demonstration of the value of functional integration in terms of user value (ensuring travel time) and responsiveness to user and societal needs (e.g. reduced space needed for the vehicles, reduced consumption of resources, responsive to diverse user needs and abilities), charging infrastructure (vehicle-to-grid integration), cost (e.g. reducing development and integration effort, number, and specs for individual components), and energy demand (e.g. load shifting).

- Testing and validation of vehicle-to-grid (V2G) functionalities in real-world conditions to ensure efficient, interoperable and software-driven integration between SDVs, recharging infrastructure..

- Improved energy efficiency and increasing sustainability with optimal-sized batteries and long-trip capability with fast charging.

- Optimal integration and demonstration of HW and SW solutions along with standardised interfaces to enable affordable, mass-market EVs, such as but not limited to SDV application domains chassis/powertrain (e.g. vehicle size), body comfort and cockpit (maximizing the interior space, comfort and safety relative to the vehicle's exterior dimensions) to achieve efficient, compact designs with minimal and sustainable material use[221].

Scope: In the past years a variety of road vehicle technologies on component and sub-system level (e. g. mechanical, electro-mechanical, electro-chemical, etc.) have been developed and offer the potential to be combined and improve user benefits at the embedded system level. The potential to further leverage these developments with Software Defined Vehicle solutions (e.g. high-level functionality ranging from energy efficiency and performance improvements to personalizing the driving experience) over the lifetime of the vehicle needs to be explored. This would bring together developers working at the embedded system level with those working on high-level functions also to ensure that novel solutions will conform with homologation requirements. Solutions coming from this project must also be compatible with current automotive standards, esp. regarding external infrastructure. Compatibility e.g. with EVSE regarding ISO 15118-20 must be ensured.

Proposed actions are expected to address all of the following aspects, where possible building upon available open-source building blocks:

- Investigate the potential of novel propulsion and chassis system/sub-systems packaging and performance from a holistic EV architecture perspective and for fast charging, significantly improving the current State-of-Art performance via digital solutions, and leveraging AI where beneficial.

[221] Also see an example blueprint of a SDV in: https://federate-sdv.eu/wp-content/uploads/2024/04/2024-04-12-SDVoF-Vision-document-ver017-final.pdf

- Include chassis and traction hardware solutions as well as standardised control and physical interfaces to improve innovation speed and software solutions, also leveraging the potential of open source.

- Develop a system architecture to ensure optimal compatibility with the high-level SW and the physical powertrain and Electrical/Electronic (E/E) systems (e.g. mechanical, electro-mechanical, etc.) with appropriate SW tooling for efficient SDV development, integration and validation, e.g. operational functionality, also including driving range improvement according to user expectations. Target applications are expected to be fit for mass-market M1 C-segment vehicle or below.

- Identify required software interfaces (Application Programming Interface and/or software services), i.e. especially which kind of information/data are required for an energy-efficient in the context of powertrain, chassis, automated driving and vehicle SW/interfaces needed for vehicle-to-grid functionalities, considering the vehicle and environment.

- Developing solutions that minimize energy use while meeting users' expectations, such as battery management, predictive maintenance, or eco-efficient routing and driving systems, leveraging AI-driven workflows where beneficial. When using AI-based approaches, projects are expected to ensure that the use AI in electric vehicles does not increase the overall energy need.

- Ensure the consistency of data and information from different sources and different market players to ensure the scaling potential of solutions (i.e. in-vehicle interfaces as part of the Vehicle Signal Specification, e.g. COVESA, Eclipse Software Defined Vehicle).[222]

- Propose recommendations on possible test protocols for future implementation and safety ratings.

- Collaborate with the Software-defined Vehicle (SDV) initiative under the Chips JU[223] by adopting relevant existing interfaces and building blocks, and proposing new ones developed within the project for potential inclusion in the SDV framework. Ensure close coordination with the European Connected and Autonomous Vehicle Alliance (ECAVA) announced in the European Automotive Action Plan.

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.

222 COVESA, the Connected Vehicle Systems Alliance; Software Defined Vehicle | The Eclipse Foundation
223 Projects Chips Ju

HORIZON-CL5-2027-03-D5-03: Data-driven circular economy for e-mobility ecosystem (2ZERO Partnership)

Call: Cluster 5 Call 03-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of between EUR 5.00 and 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.
Indicative budget	The total indicative budget for the topic is EUR 24.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B. Activities may start at any TRL.
Procedure	The procedure is described in General Annex F. The following exceptions apply: To ensure a balanced portfolio covering different sectors, grants will be awarded to proposals not only in order of ranking but at least also to the two highest-ranked proposal for each area A) Circular economy for Electric Vehicle (EV) powertrains and infrastructure; and B) Data-driven life-cycle management of Electric Vehicle (EV), provided that the proposals attain all thresholds.
Legal and financial set-up of the Grant Agreements	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) [224].

[224] 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: **Expected outcomes area A)** Circular economy for Electric Vehicle (EV) powertrains and infrastructure:

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

- Minimized cradle to grave/cradle environmental impact of EV drivetrains (excluding batteries at cell level) and Electric Vehicle Charging Infrastructure (EVCI), especially electro-mechanical components and power-electronics, via design strategies for extended life-time and reduced usage of CRM, and other materials, particularly those that may hamper high quality recycling (e.g. harmful substances), while ensuring high performance and market acceptability.

- Improved repair, recovery, refurbish and re-use of end-of-first-life drivetrain components and EVCI through accurate and standardised assessment of the health and Remaining Useful Life (RUL), which should inform better design strategies and potential business models.

Expected outcomes Area B) Data-driven life-cycle management of Electric Vehicle (EV):

- Digital-twin based circularity product passport on vehicle level, which is interoperable / compatible with the upcoming battery passport and other relevant product passports foreseen in the Eco-design for Sustainable Products Regulation (ESPR).[225]

- The ability to track & trace linked to representative EV components (e.g. power electronic converters, rotors, stators of electric motors, thermal management of battery system) by enabling advanced data collection, and the definition of minimum data needed for track & trace use in End of Life (EoL) strategies and feedback to design processes.

- Proven concept and business case for the management of data driven product lifecycle across value chains and supply chains along the entire life cycle.

Scope: The total indicative budget for the topic is EUR 7 million for Area A and 5 million for Area B. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

Scope area A) Circular economy for Electric Vehicle (EV) powertrains and infrastructure**:**

Improving the circularity of EVs drivetrain components (such as power electronic converters, rotors, stators of electric motors, gear assemblies and battery components excluding battery cells) and respective charging infrastructure is crucial for resource efficiency, sustainability, and compliance with evolving European regulations. Through durable design, predictive maintenance, refurbishment, etc, it is possible to extend the lifespan of critical components reducing material demand and waste, without jeopardising on the needed performance.

https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf

225 Regulation - EU - 2024/1781 - EN - EUR-Lex

Advanced monitoring systems can predict failures, enabling proactive repairs, and to inform improved future design strategies, and potential second life applications. Automated processes coupled with design for dismantling can facilitate efficient component recovery, reducing labour costs and improving material separation for high-value recycling.

The projects are expected to build on the results of projects funded under HORIZON-CL5-2021-D5-01-04, HORIZON-CL5-2022-D5-01-09 and HORIZON-CL5-2025-04-D5-04, as well as to consider the methodologies proposed. They are expected to target at least the same technical performance levels for the electric motor as HORIZON-CL5-2022-D5-01-09 under real-life working conditions, while optimising the design for circularity.

Proposals are expected to address all the following research activities:

- Component health monitoring for individual components on their RUL (first and subsequent) including assessment of preferred circularity strategy and expected impact on EV affordability. This includes considering the impact of wear patterns, material fatigue, and thermal stress to optimise circularity strategies and extend the lifespan of components.
- Develop novel design concepts and processes to optimise material usage and extend components' lifetime such as design for (automated) dismantling, in particular to reduce dependency on critical raw materials or enable use of alternatives.
- Promote broader Circular Economy (CE) adoption and increase the potential of reuse, repair and refurbishment by respective design criteria, means of standardisation (assessment and relevant interfaces), usage of RUL monitoring and better understanding of market potential.
- Ensure economic and environmental sustainability in the analysis of drivetrain performance and charging infrastructure (e.g. efficiency, package, user driving experience, CRM use, CE).

Scope area B) Data-driven life-cycle management of Electric Vehicle (EV):

Vehicle specific data is crucial for advancing circularity through the 9R-strategies in EVs across their lifecycle. However, this data is often not available nor accessible after vehicle production, or not measured in the use phase. Digital passports and track and trace models can improve accessibility to data, enabling predictive maintenance, lifetime extension, and optimised recycling. Harmonised data-sharing policies are essential to ensure interoperability across value chains while maintaining data security and GDPR compliance. Data governance frameworks must regulate ownership, access, and consent to protect privacy and ensure responsible use. The common European data spaces initiative, notably the common European Green Deal data space, and the Data4Energy expert group[226] offer a foundation for secure, standardised architectures, ensuring trust and controlled data sharing. Furthermore, efficiency in data collection and storage

[226] Digitalisation and data exchange are key enablers for a modern and resilient energy system - European Commission; https://ad4gd.eu/

is also critical. By integrating advanced data strategies, EV manufacturers can unlock new business opportunities and improve efficiency, while complying with regulations.

Proposals are expected to address all the following research activities:

- Development and real-life demonstration of concepts for track & trace for representative EV components (e.g. as power electronic converters, rotors, stators of electric motors, or thermal management of the battery system) ensuring access to, at least, the minimum needed data needed ensuring economic viable upscale and especially agreement on how this data can be accessed to enable/improve life-cycle management. The costs and benefits of tracing these data points should also be considered. Particular efforts should be made to ensure that the data and data management tools produced in the context of this topic are FAIR (Findable, Accessible, Interoperable and Re-usable).

- Development and real-life demonstration of concepts for measuring real-world operational loads (mechanical, electrical, thermal) experienced by the representative EV components complemented by operational and environmental usage of EV that are key for life-cycle management and assessment (LCA).

- Develop and demonstrate in real-life conditions API-based approach to data management of use phase and EoL and open interfaces that enable new business models, allow to better quantify circularity improvements, while allowing its sharing across value chains and supply chains, in a secure and privacy-compliant way.

- Concepts and solutions for product passports based on the use of digital twins (e.g. identification of relevant data points, stakeholders, in connection with existing platforms/passports, such as the battery passport, and platforms e.g. IDIS, IMDS, and Catena-X[227]) while also considering LCA aspects.

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. The topic is open to both to Light Duty and Heavy-Duty electric vehicles.

HORIZON-CL5-2027-03-D5-04: Demonstration of zero emission coaches and buses in long distance operations (2ZERO Partnership)

Call: Cluster 5 Call 03-2027 (WP2026-2027)
Specific conditions

[227] IDIS | The International Dismantling Information System; IMDS | International Material Data System; Catena-X

Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 15.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	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 the results of the demonstrations in regular operation of passenger transport operators, in long distance operations. Accelerated replication of this integration, beyond original demo partners, using specific recommendations and sharing of best practices
- Reliable operation of long distance zero emission buses and coaches in the EU.
- Improved comfort and inter-modality for long distance people mobility services.
- Demonstrated innovative zero emission solutions for long distance people mobility in a holistic approach taking net congestions challenges and charging solutions into account.

Scope: Zero emission buses for urban and sub-urban use are successfully implemented in Europe. This has addressed the need to improve air quality, reduce noise and innovate people mobility. Yet there are limitations due to range, vehicle weight and available charging infrastructure to further extend zero emission vehicles in more energy demanding long-distance (ranging from regional, national to transnational) people mobility that needs to be addressed. There is a need to further develop zero-emission solutions where vehicle weight and energy demand are challenges.

Proposed actions are expected to address all of the following aspects:

- Develop sustainable and affordable, long-distance zero emission people mobility solutions for different areas and regions with new and viable business cases based on new operation models and smart management of fleets and of coaches and buses.

- Test and apply concepts, tools and models with direct involvement of European bus/coach providers and operators to speed up deployment. Include the transition from long-distance to urban, in intermodal hubs and with park-and ride.

- Demonstrate using at least 5 coaches and buses in several operational routes in the EU and/or in corridors segments in different Member States and/or Associated Countries, focussing on long-distance operation patterns (average ≥500 km in extra-urban scenarios, in one or more routing).

- Demonstrations must cover aspects such as planning, optimised charging/refuelling schedules, passenger experience, driving time regulations, cross-border trips, charging solutions and impacts on the grid. Replication, recommendations and sharing of best practices shall be part of the demonstrations, as well as the development of new business models and the analysis of remaining legal barriers.

- Develop shared charging solutions that can be used for multiple operators and other vehicle types. Both technical and operational issues must be addressed, as well as "rush hour" at charging stations, balancing demand and supply of energy. The use of charging solutions and shared charging hubs by a variety of mobility and transport operators must be explored, also incorporating seasonal effects and operational demands.

- Based on user needs, develop flexibility in interior design to enhance travel comfort, safety and user experience, thus aiming at making it more appealing and inclusive to use this mode of transport.

- Leverage on other 2Zero projects related to Buses and HDV should be considered.[228]

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-CL5-2027-03-D5-05: Higher Voltage, Megawatt Charging System compatible, modular powertrain for Heavy Duty Vehicles (HDV) (2ZERO Partnership)

Call: Cluster 5 Call 03-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 16.00 million.

[228] Ref Examples are projects funded under CL5-2022-D5-01-10 and CL5-2022-D5-01-08

Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). Subject to restrictions for the protection of European communication networks.
Technology Readiness Level	Activities are expected to achieve TRL 7 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [229].

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

- Demonstrated integration potential and modularity of next level advanced high-voltage systems to benefit cost of Commercial Vehicles (CV) in particular for the Heavy-Duty Vehicles (HDV) segment.
- Improved energy efficiency and higher utilization potential of HDV (ensuring full operational capability for the intended usage models) via high-voltage powertrain configurations.
- Demonstrated benefits of high-voltage systems also for fast charging and auxiliary components.

Scope: Major challenges still faced by Heavy Duty Battery Electric Vehicles (HD-BEV) are cost and fast charging. As electric vehicles become more attractive through Total Cost of Ownership (TCO), significantly higher acquisition costs remain, partly caused by the wide

[229] 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

spectrum of usage scenarios and a relatively low number of vehicles, which makes development costs a significant factor for vehicle price.

Proposed actions are expected to address all of the following aspects:

- Simplify system configurations while ensuring energy efficiency for achieving economies of scale and extending component lifespans.
- Increase the voltage (post 800V) to an optimal level with regard to efficiency, affordability, and performance – and especially the compatibility with Megawatt Charging Systems (MCS) – to support faster charging needs and reduction of charging losses within the vehicle by 10 %, while considering the context of modularity and safety.
- Demonstrate the benefits of high-voltage systems also for fast charging and addressing auxiliary components, e.g. thermal management, including the modular interchangeability.
- Consider the possibility of modular and removable battery systems that would favour second-life applications to further enhance sustainability.
- Develop modular powertrain systems to enable tailored solutions for specific use cases, maintain flexibility for broader applications also by developing and defining relevant hardware and software interfaces.
- Demonstrate vehicle solutions in relevant environments to ensure the ability for effective integration with innovative Electrical/Electronic (E/E) architecture and thermal management strategies, or wider solutions.
- Evaluate life-cycle costs against previous lower voltage systems in order to identify potential improvements.

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-CL5-2027-03-D5-06: Fire prevention and mitigation for EVs in confined areas (2ZERO Partnership)

Call: Cluster 5 Call 03-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.

Indicative budget	The total indicative budget for the topic is EUR 8.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 6 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [230].

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

- Standardised fire risk assessment for EVs'[231] fire hazards in constrained spaces and areas such as underground/ built-in parking lots, garages, ferryboats and depots with and without charging facilities and during mono- or bidirectional charging.
- Innovative on-board and/or ~~/or~~ off-board affordable fire-detection, suppression, and containment measures and techniques.
- Standardised fire protocols and open evaluation frameworks.
- Enhanced public perception of fire safety across all EV categories.

Scope: The overall fire safety risks associated with Electric Vehicles (EVs) are substantially lower compared to those of Internal Combustion Engine (ICE) vehicles. However, public concerns and perceptions about EV fire safety may still persist. This necessitates a thorough examination and addressing of potential causes of EV fire to alleviate any remaining worries.

230 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

231 The focus of this topic is on vehicles in categories, M1, N1 and HDV including L-category vehicles as far as commercially available with 400V-AC or DC charging connectors

This necessitates a thorough examination and addressing of potential causes of EV fire to alleviate any remaining worries..

Proposed actions are expected to address all of the following aspects:

- Development of the most comprehensive database about fire accidents involving all EV categories at the European level.
- Mitigation measures and solutions in case of thermal runaway of batteries, if not prevented in the first place, by appropriate design or by active measures to effectively avoid open fire and its possible progression.
- A clear recognition of EV risks by improved on-board diagnosis and real-time monitoring, leading to early warning and to appropriate countermeasures.
- Development of innovative and affordable fire detection, prevention and optionally suppression solutions for constrained spaces and areas such as underground/ built-in parking lots, garages, ferryboats and depots with and without charging facilities and during mono- or bidirectional charging. This can include e.g. measures for thermal runaway, fire-resistant systems/materials, easy and safe access to the battery for removal from the vehicle.
- Development of firefighting protocols to deal with EVs on fire in narrow situations, essential for quick and effective intervention, including integration with existing safety standards (e.g., ISO, NFPA) to ensure smooth adoption and compatibility.
- Social awareness for a transparent, informed public perception of the safety level of all EV categories, also with the development of a European based platform for dissemination and information with direct involvement of main stakeholders.

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.

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.

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The topic is open to international collaboration, and the funded project are expected to seek synergies with the Sustainable Transport Forum[232] and with the EV TCP Task 49[233].

Aviation

Proposals are invited against the following topic(s):

HORIZON-CL5-2026-05-D5-07: AI-assisted digital aircraft design, manufacturing and MRO, towards a competitive aviation

Call: Cluster 5 Call 05-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 10.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Legal and financial set-up of the Grant Agreements	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) [234].

232 In particular on fire safety issues, see e.g. "Guidance of fire safety for electric vehicles parked and charging infrastructure in covered parking spaces", doi:10.2832/6681178, https://op.europa.eu/en/publication-detail/-/publication/c2c1f892-f3ef-11ef-b7db-01aa75ed71a1/language-en, last visited 2025-04-30

233 Electric Vehicle Technology Collaboration Programme, Task 49: EV Fire Safety, https://evtcp.org/task/task-49/, last visited 2025-04-30

234 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

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

- AI-assisted digital aircraft design, redesign and certification – in collaboration with existing or improved digital twins and virtual products.
- AI-assisted design tools for aircraft requirement definition, validation and verification, to improve efficiency of the system design activities.
- AI-assisted digital (i) aircraft manufacturing, (ii) aircraft operation, condition monitoring and prediction, (iii) maintenance, repair and overhaul operations.

Scope: This topic focuses on the development of robust AI-assisted capabilities that will work in tandem to digital twins. The term aircraft includes propulsion, aerostructures, systems and their integration, if not explicitly addressed.

Proposals may focus on:

- Robust, reliable, verifiable and accelerated training of AI-assisted digital capabilities;
- Efficient and high-performance AI-assisted computing, in connection to complex multi-disciplinary design and optimisation methodologies – at system and/or at integrated level;
- Protocols, standards and AI-assisted digital capabilities for the entire aircraft manufacturing and MRO supply chain;
- Accelerated experimental validation capabilities of machine learning algorithms, for selected industrial use cases, linked to novel EU research and technology infrastructures;
- Verifiable and reproduceable usage of Generative AI and Large Language Models for recommendation systems and information retrieval, especially within areas under authority regulation to maintain airworthiness and safety of airframes and their major systems (i.e. using Explainable Generative AI or surrogate models);
- AI-assisted prescriptive maintenance procedures for efficient condition-based maintenance and maximized circularity by optimizing the utilization of the globally available high-value items (components, engines, airframes);
- AI-assisted maintenance assistance systems for efficient human-in-the-loop integration.

HORIZON-CL5-2027-03-D5-08: Sustainable aircraft circular design and additive manufacturing, towards a climate neutral aviation

Call: Cluster 5 Call 03-2027 (WP2026-2027)
Specific conditions

Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 2.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 5.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Legal and financial set-up of the Grant Agreements	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) [235].

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

- Additive manufacturing including high performance polymers, composites and metals, offering significantly improved performance compared to state-of-the-art. Entire process including design / manufacturing / characterization and testing / certification.
- Sustainable aircraft circular design and manufacturing processes of individual high-value components towards further developing the innovation pipeline from system demonstration to deployment stage in the EU and Associated Countries.

Scope: This topic focuses on:

- Additive design and manufacturing of aircraft and engine structural components have already transformed the industry and are expected to be the key to the EU competitiveness. Geopolitical aspects for raw materials reinforce the importance of additive manufacturing, while the European RTOs and industry recognised that there is a substantial untapped

[235] 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

potential towards even higher energy efficiency, savings in critical raw materials and higher quality parts. The main objective of this topic is to resolve existing challenges in the AD/AM of metal, high performance/value polymer and composite parts, related to residual stresses, non-equilibrium phase transformations, joining, defects and reproducibility among others.

- Building on previous research efforts (i.e. H2020-SUSTAINair) and EREA's Future Sky initiatives on circular aviation, proposals should focus to real, challenging and competitive industrial use cases for circular design of individual components, joining technologies, improved maintenance and repair technologies to extend aircraft lifetime and improved recovery of high-quality recycling materials. Especially as regards engines and safety critical systems, real-time condition monitoring and inspection methods have the potential to improve repairability by determining an optimized degradation status, allowing smart repairs on-wing and on-site that reduce or postpone the need for material- and energy-intense overhauls or replacements.

HORIZON-CL5-2027-04-Two-Stage-D5-09: Noise reduction breakthroughs for new ultraefficient aircraft

Call: Cluster 5 Call 04-2027 (2-stage) (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 2.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 5.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Legal and financial set-up of the Grant Agreements	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) [236].

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

- Airframe / cabin noise for new aircraft design;
- Engine noise sources and installation effects;
- Noise perception/annoyance and mitigation methodologies.

Scope: The topic aims to deliver advanced and validated numerical and experimental aero-acoustic methodologies for the noise prediction of new ultraefficient aircraft designs, primarily for large passenger aircraft with new open fan engine architectures and ultra-high by-pass ratio architectures.

The topic should reinforce fundamental understanding, fill gaps and propose new/updated technologies towards enabling open fan designs and techno bricks for significantly reduced cabin noise. Mayor emphasis is expected to be put to existing/new experimental data and procedures, multi-disciplinary design and optimisation, aerodynamics, aeroacoustics and noise reduction integrated metamaterials/structures.

In addition, the proposals may also provide even better noise footprint assessments and better annoyance understanding and mitigation methodologies.

The topic should build upon lessons learnt and gaps identified from H2020.CS2-LPA-01-D01 as well as complementing the projects resulted from HORIZON-CL5-2022-D5-01-12.

Waterborne transport

Proposals are invited against the following topic(s):

HORIZON-CL5-2026-06-Two-Stage-D5-10: Disruptive Technologies and Innovative Concepts for Energy Saving Onboard of long-distance ships (ZEWT Partnership)

Call: Cluster 5 Call 06-2026 (2-stage) (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed

[236] 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

	appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 15.00 million.
Type of Action	Research and Innovation Actions
Admissibility conditions	The conditions are described in General Annex A. The following exceptions apply: Applicants submitting a proposal for a blind evaluation (see General Annex F) must not disclose their organisation names, acronyms, logos nor names of personnel in the proposal abstract and Part B of their first-stage application (see General Annex E).
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 4-5 by the end of the project – see General Annex B. Activities may start at any TRL.
Procedure	The procedure is described in General Annex F. The following exceptions apply: The first-stage proposals of this topic will be evaluated blindly.
Legal and financial set-up of the Grant Agreements	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) [237].

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

[237] 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

1. Development of novel and disruptive technologies and innovative concepts that demonstrate at least 25% energy savings for long distance shipping, compared to 2008 levels.

2. Established methodology for assessing the energy savings from the proposed solutions, considering the implementation of the IMO GHG strategy and of the FuelEU Maritime Regulation.

3. Proven scalability and replicability of the developed technologies and concepts to various ship types, operational profiles and navigational routes.

4. Assess the economic viability, environmental and climate impacts of the technologies and innovative concepts.

5. Defined implications and impacts of the proposed solutions regarding safety and operational aspects, also addressing competences and skills issues for the adoption and operation of such technologies.

6. Consider AI-based and digital twin features for optimisation and energy management aspects. Relevant improvements should not be considered as part of the at least 25% energy savings target.

Scope: Energy consumption of long-distance shipping should be reduced significantly to achieve sustainable worldwide trade. To achieve a more sustainable and environmentally friendly shipping industry, it is essential to continue developing disruptive technologies, advanced materials, and innovative concepts that can significantly reduce energy consumption of long-distance shipping. The objective of this topic is to support solutions for propulsion and non-propulsion energy consumption that aim to achieve at least at least 25% energy savings in long distance shipping as compared to 2008 levels, through the development and integration of standalone solutions. These technologies include (but are not limited to) active or passive increased performance solutions, novel propulsion systems, augmented propulsion technologies capitalizing also on ship motions, hull performance enhancements and the use of advanced materials which can further enhance energy efficiency and reduce the environmental impact of vessels. Any fuel-related proposals should only consider renewable low and zero-carbon fuels. These technologies and concepts should be applicable to various types of ships, including ro-pax, container ships, bulk carriers, and tankers.

Proposals are expected to address all the following aspects:

1. Development and demonstration at TRL 4-5 of novel, high-uncertainty but high-reward technologies that significantly reduce energy consumption in long distance shipping.

2. Development of various ship concepts, conducting replication studies for different case scenarios and modelling the real overall energy savings of the solutions and concepts developed.

3. Development of methodologies measuring the impact of the energy efficiency achieved on the GHG intensity and the impact on air pollution of the energy used for propulsion specifically for long distance shipping, with a focus on emission reductions, also facilitating the introduction of such technologies under the scope of LCA guidelines and FuelEU Maritime, and improving the EEDI, EEXI and CII performance where relevant.

4. Consider links with digital twin and AI-based optimisation aspects for the considered technologies (e.g., adaptive and model-predictive control), including the necessary sensing systems, to expand the system's future capacities.

5. Model the economic viability of the developed technologies, considering initial investment, operational savings, maintenance costs, and potential financial incentives, to assess the economic feasibility while also facilitating decision-making in the design process.

6. Assessment of the safety and environmental implications of the solutions, including technical and operational risks, possible impacts to ships, ports and other land infrastructure.

7. Ensure appropriate sustainability of the action outputs by elaborating on a technology development roadmap and by exploring business cases.

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. Proposals are encouraged to include synergies with shipyards, equipment manufacturers and providers, including start-ups and SMEs, located and/or manufacturing in the EU and EEA.

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-CL5-2026-05-D5-11: Scalability of Solid Oxide Fuel Cells for waterborne transport (topic in collaboration between the Zero-Emission Waterborne partnership and the Clean Hydrogen Joint Undertaking)

Call: Cluster 5 Call 05-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 16.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	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 are expected to contribute to all the following expected outcomes:

- Improve the suitability, efficiency and cost-effectiveness of SOFC for maritime transport use-cases, taking into account the maritime perspective by design and contributing to the objectives of the FuelEU Maritime.
- Development of large, solid oxide fuel cell stacks and module with improved performance, reliability and durability.
- Improvement of testing protocols and diagnostic tools for solid oxide fuel cell stacks in maritime environments.
- Development of innovative measuring and sensor devices for monitoring and controlling solid oxide fuel cell stacks
- Investigation of the potential for solid oxide fuel cell stacks to operate with hydrogen and derivatives of hydrogen, such as ammonia, methanol, and methane.
- Development of scalable and cost-effective manufacturing processes for solid oxide fuel cell stacks
- Development of a viable pathway towards lifecycle cost of large solid oxide fuel cell systems over 80.000 hours, ensuring competitiveness with incumbent technology (ICE) operated on renewable low and zero-carbon fuels.
- Enhancement of safety of solid oxide fuel cell systems onboard vessels, including improved detection, suppression, and explosion prevention measures.

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Project results are expected to contribute to the KPIs for maritime transport of the Clean Hydrogen JU SRIA by 2030, including FC power rating, FCS lifetime, CAPEX, electrical efficiency, availability and warm start time.

Scope: **This topic will be transferred into the CHJU WP and removed from the main HE CL5 WP26-27.**

Solid oxide fuel cells have the potential to provide a clean and efficient source of power for waterborne applications, but there are still significant technical and economic challenges to be addressed before they can be widely adopted. Current solid oxide fuel cell stacks are not yet robust or reliable enough for waterborne transport, especially maritime use, and there is a need for further research and development to improve their performance, durability, and cost competitiveness. The topic also considers the objectives of the co-programmed Zero-Emission Waterborne Transport (ZEWT) partnership, developing the technology blocks necessary to implement the R&I roadmaps of both the Clean Hydrogen Joint Undertaking and ZEWT.

To address the challenges associated with solid oxide fuel cell for maritime applications, proposals are expected to address all the following aspects:

- Testing for validation the SOFC to improve its safety, reliable operation onboard, durability and efficiency in maritime conditions, addressing common challenges such as corrosion, vibration, tilting, aggressive environmental conditions (temperature/humidity variations) and saltwater mist exposure.

- Design and manufacturing of a minimum 100 kW SOFC system, specifically designed to operate with multiple fuels and at ambient conditions typical of a ship machinery space capable of operating when subject to vibrations, shock and tilting of +/- 22.5 degrees in all directions and work in an environment with marine aerosol and at temperature and humidity conditions typical of a waterborne vessel, showing also theoretic scalability to at least two different ship types.

- Design the system as a building block for at least 1000 kW power system, designed for propulsion, hotel load or both, aiming at a comparable installation footprint to a 1 MW PEMFC for the same application, and in any case optimising the spatial footprint considering safe and effective operation and ease of maintenance.

- Testing of the SOFC system performance with each fuel and over at least 1000 hours total with one or successively two fuels, in relevant environment, providing power, in a fuel cell/battery hybrid arrangement, following the load profile representative of a real maritime application.

- Modelling and testing the SOFC system with special attention to energy efficiency, dynamic load, and heat management, as well as emissions for various alternative fuels.

- Improvement in the design of control system to follow the load in maritime applications and for increased numbers of start and stops.

- Carrying out Techno-economic and sustainability assessments documenting the environmental viability of the selected fuels and its compatibility with SOFCs.
- Improvement in design, maximise lifetime, reliability and availability and simplify the maintenance and repair; Development of diagnostic and prognostic tools for solid oxide fuel cell stacks, including online monitoring, predictive maintenance and monitoring degradation/failure.
- Explore fuel cells designs enabled for circularity of materials in end-of-life fuel cells, developing, quantifying and validating degradation mitigation strategies for the >50 kW system.
- Additionally, a strategy for skills development should be presented, associating social partners and civil society where relevant. The strategy should the safe handling of solid oxide fuel cell stacks and the training of emergency response personnel.
- Achieve the classification requirements including reliability and operational safety in marine environments.

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. Proposals are encouraged to include synergies with shipyards, equipment manufacturers and providers, including start-ups and SMEs, located and/or manufacturing in the EU and EEA.

HORIZON-CL5-2026-05-D5-12: Shipyards of the future (ZEWT Partnership)

Call: Cluster 5 Call 05-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 10.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 21.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of

	Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). Subject to restrictions for the protection of European communication networks.
Technology Readiness Level	Activities are expected to achieve TRL 8 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [238].

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

1. A strengthened European value chain cooperation and integration between equipment manufacturers and large, medium, and small-scale shipyards resulting in enhanced European competitiveness.
2. Demonstration of improved shipyard manufacturing processes in small and medium-size shipyards, capable of building waterborne vessels in the EU/EEA.
3. Reduced complexity to perform future retrofits of vessels and enabling the later inclusion of several emissions saving technologies and solutions.
4. Higher capability and efficiency of European shipyards and equipment manufacturers to meet the increasing need to convert the shipping fleet towards zero-emission and biodiversity friendly maritime transport.
5. Making the shipbuilding and retrofitting industry better prepared for building and replicating low-to-zero emission ships.

Scope: European shipbuilding industry is facing increasing pressure from international players, and there is a need to improve its competitiveness through innovation and technological advancements. The MARI-4YARD project together with RESURGAM, FIBRE4YARDS, SMARTYards and PENELOPE developed several solutions on materials, processes, AI and skills. Additionally, the project SEUS in Horizon Europe is developing an integrated software

[238] 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

platform with the ambition to save time in engineering, assembly and construction at European shipyards. However, there is still a need to increase the ambition and demonstrate these solutions in medium and small-size shipyards.

At the same time, shipyards are often located in sensitive natural areas, such as coastal regions and estuaries. This provides an opportunity for shipyards to evaluate and reduce their impact on the surrounding biodiversity.

The topic aims to improve efficiency and sustainability of European ship newbuilding and retrofitting processes, to improve the use of resources and circularity, to develop necessary skills and improve working conditions. This requires considering all relevant innovations such as robotics, automation, digitalization and AI in the context of shipbuilding to enhance EU/EEA -focused value chains. The purpose is to increase the competitiveness of the European shipbuilding sector with a view to further replicating and utilizing results, including in potential applications to the Innovation Fund.

Proposals are expected to address all the following aspects:

1. Deployment and integration of innovative technologies and systems in small and medium-size EU and EEA shipyards to enhance the competitiveness and sustainability of newbuild, repair and retrofit processes and process chains.
2. Pilot applications should consider all aspects of the shipbuilding process (including technological, business-related and organizational aspects), equipment, and ship design, potentially including:
    a. Automation and robotics in shipbuilding processes;
    b. Advanced digitalization in design and production;
    c. Innovations in retrofitting and predictive maintenance of shipbuilding assets;
    d. Circular economy in all relevant processes (construction, repairs, retrofitting and dismantling).
3. Pilot applications should also consider systems interoperability and integration with existing shipyard infrastructure, tools and equipment.
4. Explore advanced ways of digital collaboration (co-simulation, sharing digital data) while considering cyber security, to improve synergies within value chains, including equipment manufacturers, shipyards, ship designers and shipowners.
5. Testing and physical demonstration of the developed technologies in real life shipyard ecosystem and as much as possible in relation with full scale ship building, including benchmarking of existing practices and consideration of environmental impacts and potential safety improvements for workers. Demonstrations should take place in at least three EU/EEA shipyards.

6. Develop biodiversity friendly strategies, integrating nature-based solutions on site, promoting circularity and sustainability of processes.

7. Additionally, a strategy for skills development should be presented, associating social partners and civil society where relevant.

8. Propose measures to solidify the current strengths of smaller and medium-sized shipyards across Europe, with a focus on increasing competitiveness and growth, reinforcing and growing European shipyards and improving environmental performance.

9. For exploitation purposes, proposals should:

    a. Develop business plans and rollout strategies, including measures to reduce knowledge and technology leakage outside of Europe.

    b. Identify clear target groups (vessel types, segments and processes) and their current state, deficiencies and improvement needs, and make a clear exploitation strategy on how to roll out the results to end-users.

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. Proposals are encouraged to include synergies with shipyards, equipment manufacturers and providers, including start-ups and SMEs, located and/or manufacturing in the EU and EEA.

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-CL5-2026-05-D5-13: Safety of renewable low and zero-carbon waterborne fuels in port areas: risk assessment, regulatory framework, and guidelines for safe bunkering, handling and storage (ZEWT partnership)

Call: Cluster 5 Call 05-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 2.00 million.
Type of Action	Coordination and Support Actions

Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Legal and financial set-up of the Grant Agreements	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) [239].

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

1. A comprehensive risk assessment of the introduction of renewable low and zero-carbon waterborne fuels, in maritime and inland port areas.
2. Improve knowledge on the risks posed by the introduction of renewable low zero-carbon fuels.
3. A review of existing regulations, standards, and guidelines, for all EU Member States, with recommendations for updates, harmonisation or new regulations as needed.
4. Define operational improvements required to enhance safety in storage, handling and bunkering of renewable low and zero-carbon fuels.
5. Development of a strategy for skills development for port personnel and stakeholders involved in the handling, storage, and bunkering of renewable low and zero-carbon fuels, ensuring safe and efficient operations.

Scope: The rapid transition to low and zero-carbon solutions in maritime and inland waterborne transport requires port authorities and stakeholders to swiftly adapt to supply large quantities of renewable low and zero-carbon fuels and electricity. However, this shift poses new safety challenges, particularly in port areas where multiple bunkering operations, import/export terminals, and fuel handling and storage activities coexist. The close location of most ports to cities and inhabited areas raises issues of safety on two fronts: the space deficit due to the difficulty of enlarging the port areas in these locations, (leading to e.g. the storage of various

[239] 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

fuels in close proximity), and the broader danger to these inhabited areas due to their proximity to the ports and by extension the storage of these fuels. To ensure a safe and efficient energy transition, it is crucial to assess and mitigate the risks associated with the introduction of renewable low and zero-carbon fuels in port areas. As not all ports will be able to store every type of clean fuel in the port or neighbouring area, safety of transport and distribution within the port area (including anchorage) should also be analysed.

Existing EU legislation regarding specifically the safety of port workers is limited. The Directive on the safe loading and unloading of bulk carriers (2001/96/EC) sets out the EU requirements which increase safety procedures for bulk carriers loading and unloading their solid cargo in EU ports. Further instruments such as the Directive on port State control (2009/16/EC) and the Directive on the investigation of accidents in the maritime transport sector (2009/18/EC, recently amended), while related to safety in the maritime sector, do not apply to the safety of port workers specifically. Broader instruments such as the EU Occupational Safety and Health Framework Directive (89/391/EEC) and the Directive on the Minimum Safety and Health Requirements for the Use of Work Equipment by Workers at Work (2009/104/EC), while applicable to port workers due to their general character, miss the intricacies needed to address the specific risks of workers in this sector. This issue is further exacerbated by the fact that port workers are being exposed to new risks due to the rising use of renewable low and zero-carbon fuels in the maritime sector and the need for safe bunkering and storage of these fuels in port areas.

Given the above it is important to have a clear picture of the current status regarding the storage and bunkering of fuels across EU ports, identify existing and applicable legislation, map gaps and potential risks and make appropriate recommendations for follow-up actions.

Proposals are expected to address all the following aspects:

1. Conduct a comprehensive review of the risks associated with the introduction of renewable low and zero-carbon fuels within (inland and sea) the port areas, including distribution, simultaneous bunkering operations, import/export terminals, handling and storage of fuels.

2. Analyse gaps in existing regulations, standards, and guidelines relevant to the safe handling and storage of renewable low and zero-carbon fuels, in maritime and inland TEN-T ports.

3. Identify safety risks not adequately addressed by current rules and risk assessments, including Hazard Identification (HAZID) and Quantitative Risk Assessments (QRA) taking into account - inter-alia - gas dispersion, fire/explosion impacts and their probabilities using F-N curves.

4. Develop guidelines and recommendations to ensure safe operations (considering environmental and health aspects) per fuel type in port areas, considering varying port sizes, services (including technical-nautical vessels), locations, and geographies, especially for ports located in populated areas including establishing safety zones.

International rules, standards and guidelines should be taken into consideration (especially from the IMO and the IHPA where relevant). Relevant environmental Plans required by EU or national legislation such as Air Quality Plans should be considered.

5. Develop standard risk assessment criteria for groups of ports with similar characteristics, operational and weather conditions by researching and establishing standard criteria for risk assessments in port planning and development. This includes defining safety-by-design procedures for new port infrastructures and bunkering operations.

6. Engage with relevant stakeholders, including port authorities, terminal operators, shipping companies, trade unions and regulatory bodies, to ensure the practicality and effectiveness of the developed guidelines and recommendations.

7. Additionally, a strategy for skills development should be presented, associating social partners and civil society where relevant. This strategy should include the design and implementation of comprehensive training modules tailored to various roles within port operations, focusing on the specific safety protocols and procedures associated with renewable low and zero-carbon fuels.

8. Propose certification and continuous professional development pathways to maintain high safety standards and adapt to evolving technologies and regulations.

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-CL5-2026-05-D5-14: Ports of the future (ZEWT Partnership)

Call: Cluster 5 Call 05-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 10.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 21.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of

	Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). Subject to restrictions for the protection of European communication networks.
Technology Readiness Level	Activities are expected to achieve TRL 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.

1. Ensured applicability and replicability of sustainable and digital strategies at port level for middle and small-size maritime ports and inland ports across all the EU, balancing geography and size. Ensured increased adoption of sustainable waterborne transport practices in ports of all sizes.

2. Sustainable and digital strategies will prepare middle and small-sized ports to enhance their competitiveness with a focus on cost-effective and scalable adaptation measures, increase their climate resilience and biodiversity friendliness, and improve safety for port workers and crews of ships at berth.

3. Sustainable and digital strategies will reduce emissions of GHG, air and water pollutants and other biodiversity impacts from ports, applying innovative solutions for zero-emission and biodiversity friendly port operations and ships at berth. Strategies should be applicable to maritime and inland waterway middle-sized and small-sized ports and located throughout Europe.

4. Contribute to the objectives of the EU Port Strategy.

5. Development of sustainable and digital strategies that not only enhance the competitiveness of middle-sized and small-sized ports but also mitigate health risks for populations in port areas.

Scope: Ports are important multimodal hubs in the supply chain, linking the sea with the hinterland, evolving into critical hubs and facilitators of sustainable energies, are clusters of industry and circular economy, as well as geo-political and geo-economic resilience. Europe needs ports that are competitive and sustainable on local, regional and global levels, and the Competitiveness Compass calls for a new strategy to highlight the role that European ports will play in the future EU economy.

The Green Deal aims to achieve climate neutrality by 2050 and to reverse the degradation of ecosystems by 2030. The EU Sustainable and Smart Mobility Strategy[240] (SSMS) states that infrastructure must be adapted to climate change, less biodiversity harmful and made resilient

[240] https://transport.ec.europa.eu/document/download/be22d311-4a07-4c29-8b72-d6d255846069_en?filename=2021-mobility-strategy-and-action-plan.pdf

to disasters. In line with the SSMS, it is also important that ports can provide increasing volumes of clean and decarbonised energy sources, notably renewable energy, and on a modernised grid.

Proposals are expected to address all the following aspects:

1. Identify innovative technologies, as well as results from EU-funded research projects and other technological, economic and social best practices. Consider mature technologies ready to be deployed in middle and small-sized ports across the EU contributing to the expected outcomes. Address challenges and opportunities for the implementation and/or for commercial deployment of these solutions in small and medium-sized maritime ports and inland waterway ports located throughout the EU.

2. Developing strategies contributing to the expected outcomes for middle and small ports across the EU following a geographical balance, contributing to the objectives of the EU Ports Strategy.

3. Design and demonstrate integrated smart energy systems and grids for port and waterborne transport operations, including energy production, storage and OPS operations, covering the needs for electrification and charging of port terminal equipment, and modes of transport connecting the port to the hinterland, such road transport, nearby industry and buildings) to make the solutions more energy- and cost-effective.

4. Develop climate resilience strategies of middle and small size ports and their infrastructure, including adaptation measures to address sea-level rise, extreme weather events, and other climate-related risks, with a focus on cost-effective and scalable solutions (such as nature-based solutions), building on best practices developed in EU-funded research projects.

5. Analyse how VTMIS and port community systems can be developed and exploited to their full potential, harmonizing functionalities whenever possible, paving the way to automatic shipping. Consider possible linkages to eMSW and eFTI.

6. Apply digital standards and common semantics which enable the harmonisation of collection and analysis of GHG and pollutant emissions at small and medium sized TEN-T ports network.

7. When developing digital solutions proposals should consider cybersecurity implications and develop solutions that assess and manage vulnerabilities in IT and OT systems, establish robust incident response plans, implement strong access control measures, network and supply chain security, in line with EU standards such as the NIS Directive and the Cybersecurity Act and with the goal of achieving resilience and redundancy.

8. Explore long-term workforce requirements for zero-emission, climate-resilient, biodiversity friendly, safe and competitive port operations, ensuring continuous knowledge transfer between universities, vocational training providers and industry.

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9. Develop a R&I roadmap for solutions of EU and EEA ports to address the areas covered under the expected outcomes, taking into consideration 2035 as an intermediate milestone and 2050 as the final one.

10. Explore, with competent authorities and stakeholders, how environmental aspects related to zero pollution and circular economy for ports as well as maritime and inland waterway vessels can be improved in an environmentally and economically sustainable way (through reception facilities, degassing facilities, OPS...), in line with the ambition expressed in i.a. NAIADES III, SUMPs, local or regional Air Quality Plans and Waste Management Plans. Collaborate with industry stakeholders and regulatory bodies to align project outcomes with EU policy objectives, particularly the Port Strategy.

11. Explore cooperation between ports, as well as stronger horizontal networking, to increase the efficiency of undertakings and improve the integration of European ports.

12. Evaluate the financial implications of proposed solutions and identify possible strategies and tools for financing/funding as well as business models that go beyond request of public support.

Solutions at project level must be demonstrated in at least six medium and small-sized TEN-T ports ensuring a geographical balance, of which five are maritime ports and one inland. Not all solution must necessarily be demonstrated in all ports.

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. Proposals are encouraged to include synergies with shipyards, equipment manufacturers and providers, including start-ups and SMEs, located and/or manufacturing in the EU and EEA.

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-CL5-2027-03-D5-15: Prospective evaluation of nuclear power potential for shipping (ZEWT Partnership)

Call: Cluster 5 Call 03-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 2.00 million.
Type of Action	Coordination and Support Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). Subject to restrictions for the protection of European communication networks.
Legal and financial set-up of the Grant Agreements	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) [241].

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

1. Drafting of a R&I roadmap towards deploying nuclear power in commercial shipping, including small modular reactors (SMRs) and other advanced nuclear technologies (e.g. complementing the latest European Industrial Alliance on SMRs technology roadmap[242]), including identification of research gaps, infrastructures and future innovation needs

2. Mapping of relevant regulatory regimes nationally, regionally and internationally for the use of nuclear-powered shipping, including recommendations on regulatory frameworks and international cooperation.

3. Development of scenarios for the use of the technology, including potential damage scenarios.

241 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

242 European Industrial Alliance on Small Modular Reactors, https://single-market-economy.ec.europa.eu/industry/industrial-alliances/european-industrial-alliance-small-modular-reactors_en

4. The implications for National Energy and Climate Plans and National Air Pollution Control Programmes as well as water pollution policies required by EU legislative framework.

5. Assessment of total cost of ownership for the deployment of current and potential technologies.

6. Development of safety, training and operational guidelines for nuclear-powered ships.

Scope: Nuclear propulsion has the potential to reduce emissions of air pollutants and to decarbonize the shipping sector, producing zero GHG tank-to-wake emissions and low upstream well-to-tank emissions. A coordinated effort among various stakeholders including industry partners, research performing organisations, NGOs, the European Commission, the International Atomic Energy Agency (IAEA), and the International Maritime Organisation (IMO) should help evaluate such prospective potential. It should benefit from the latest Research and Innovation (R&I) results, technical, socio-economic and environment studies, or initiatives being capitalised at EU and international level, to ensure a comprehensive assessment.

The main objectives are to assess the feasibility, safety, and environmental impact of using nuclear power for shipping to achieve zero-emission of GHG, air and water pollutants in maritime transport. Following a preliminary assessment and literature review, as well as detailed technical and economic studies regulatory and technical recommendations should be developed, along with a review of on-going pilot projects aimed at demonstrating the feasibility of nuclear-powered vessels.

The project should help evaluate the technical, economic, regulatory, environmental and social aspects of deploying nuclear power in commercial shipping, including small modular reactors (SMRs) and other advanced nuclear technologies.

Actions should address all the following aspects:

1. Technical Feasibility: a) To assess the suitability of SMRs and other nuclear technologies for maritime use; b) To evaluate any integration challenges with existing and potential new ship designs, including modular designs.; c) To study the lifecycle of nuclear-powered vessels, including construction, operation, and decommissioning.

2. Economic Viability: a) To conduct cost-benefit analyses comparing nuclear-powered shipping to conventional and renewable low and zero-carbon fuel options, taking into account the long-term availability of fuel and the cost of disposal of residues; b) To evaluate infrastructure requirements in the EU, such as port facilities for nuclear vessels; c) Mapping full costs for a nuclear propelled ship on a life cycle basis.

3. Safety and Security: a) To develop safety protocols for nuclear-powered ships, including emergency response and accident mitigation; b) To address cybersecurity risks, external threats and proliferation concerns and safety in ports. c) Assessing long-term crew training

requirements for nuclear operations, safety and security and their implementation in international training and certification regulations.

4. Environmental Impact: a) To analyze the potential reduction of greenhouse gas emissions, air and water pollutants caused by mining, refining, use and disposal of spent nuclear fuel; and b) To assess the impact of nuclear waste management, disposal as part of implementation of a circular economy approach c) To analyze possible damage scenarios with a view to liability issues and mitigation of damages.

5. Regulatory and Legal Framework: a) To identify gaps in international maritime law and IAEA nuclear regulations; and b) To propose recommendations related to the International Convention for the Safety of Life at Sea (SOLAS)[243] and other relevant treaties

6. The implications for National Energy and Climate Plans and National Air Pollution Control Programmes required by EU legislative framework.

7. Additionally, a strategy for skills development should be presented, associating social partners and civil society where relevant.

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-CL5-2027-03-D5-16: Autonomous vessels in short sea shipping and inland waterways

Call: Cluster 5 Call 03-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 15.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of

243 https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Safety-of-Life-at-Sea-(SOLAS),-1974.aspx

	Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). Subject to restrictions for the protection of European communication networks.
Technology Readiness Level	Activities are expected to achieve TRL 7 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [244].

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

1. Demonstration of remote-control operation of vessels without crew, controlled remotely (degree three[245]).

2. Development of concepts for fully autonomous ship where the operating system on the vessel is able to make decisions and determine actions by itself (degree four[246]).

3. Strengthen market confidence in the integration of remote and automated navigation in ship types and services that may see a shortage of workforce in the next decade.

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244 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

245 100th session of IMO's Maritime Safety Committee (MSC 100): *Remotely controlled ship without seafarers on board: The ship is controlled and operated from another location. There are no seafarers on board.*
For inland navigation purposes, the demonstration should allow for demonstration on the conditions described for degree 3 of automation as described before, as well as, achieving degree 3 and aiming for degree 4 of automation under the 2022 CCNR Explanatory note related to the international definition of levels of automation in inland navigation - https://www.ccr-zkr.org/files/documents/AutomatisationNav/Note_explicative_en.pdf

246 100th session of IMO's Maritime Safety Committee (MSC 100): *Fully autonomous ship: The operating system of the ship is able to make decisions and determine actions by itself.*
For inland navigation purposes, the demonstration should allow for demonstration on the conditions described for degree 4 and aiming for degree 5 of automation under the 2022 CCNR Explanatory note related to the international definition of levels of automation in inland navigation - https://www.ccr-zkr.org/files/documents/AutomatisationNav/Note_explicative_en.pdf

4. Contribute to the EU Port Strategy and the EU Industrial Waterborne Strategy, as well as the EU AI Strategy and the EU Apply AI Strategy.

Scope: Maritime Autonomous Surface Ships (MASS) have been the focus for several projects both with EU-funding and individual countries but a major breakthrough leading to extensive deployment and widespread commercial maturity are still not achieved. Autonomous vessels can offer safer and more efficient operations and cost savings. New skills and training needed for MASS is a critical issue to ensure safe operations.

Projects are expected to address all the following aspects:

1. Demonstration of two different remotely controlled vessels without seafarers on board, considering the most promising areas of operation and types of ships towards market adoption. The demonstration should be performed in at least one short-sea shipping vessel.

2. Demonstration of two different fully autonomous operation in at least one inland waterway vessel.

3. Demonstrations and concept studies should address the whole navigation voyage, including port calling, mooring, and berthing, potential offshore charging solutions, and passing through locks in all weather conditions[247].

4. Demonstrations should also include aspects for predictive maintenance, self-diagnostic systems to ensure optimal functioning of the vessel's equipment and structure

5. Identify and address implementation bottlenecks for relevant ship types, such as data quality and lack of infrastructure related to waterborne transport. Map infrastructure and investment needs for extensive roll-out for automated ships operations

6. Appropriate steps to ensure sufficient cyber risk management of the systems and infrastructure used when conducting trials[248].

7. Address standardization needs and possible safeguards to secure data-integrity and cyber security. Provide recommendations to the relevant regulatory bodies.

8. Address the risk of data being transferred beyond the borders of the EU/EEA and the impacts it could have on EU fleets.

9. Integrate ongoing legal processes at EU level and at the IMO related to inland automated vessels and MASS i.e., MASS Code, Search&Rescue and Remote Operating Centres.

10. Address safety considerations (using EMSA's Risk Based Assessment Methodology) and upskilling of port and vessel operators.

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247 Proposals should build upon the results of HE projects DYNAPORT and MISSION on port call optimisation.

248 Proposals should build upon the results of HE projects AUTOFLEX and FOREMAST, and just starting WARRANT and D-NAVIO.

11. Address the carbon footprint of data processing in order to operate autonomous vessels and ensure no significant harm to biodiversity.

12. Projects should exceed outcomes of previous or on-going projects in relevant ship types.

13. Model the economic viability of the developed solutions, considering initial investment, operational savings, maintenance costs, and potential financial incentives, to assess the economic feasibility while also facilitating decision-making in the design process. All while considering the societal aspects of future shortening workforce.

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. Proposals are encouraged to prioritise shipyards, equipment manufacturers and providers located and/or manufacturing in the EU and EEA.

HORIZON-CL5-2027-03-D5-17: Innovative Solutions for mitigating the environmental impact of waterborne transport in marine and aquatic Ecosystems (ZEWT Partnership)

Call: Cluster 5 Call 03-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 14.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 5 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of	The rules are described in General Annex G. The following exceptions apply:

the Grant Agreements	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) [249].

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

- Improved water resilience and good environmental and good ecological status in European waters and contribute to the achievement of the European Union's environmental targets, including the future Water Resilience Strategy and the European Oceans Pact.
- A comprehensive understanding of the future environmental impacts of waterborne transport on marine and aquatic ecosystems, addressing in particular pollution sources from: i) navigation on renewable low and zero-carbon fuels; and ii) accidental spills of renewable low and zero-carbon fuels for marine waters, inland waters and ports (water and air quality).
- Innovative prevention, abatement and mitigation systems and strategies for reducing and eliminating the harmful impacts of waterborne transport on waters.
- Enhanced pollution prevention and mitigation in marine waters, inland waterways and port areas, reducing the likelihood and impact of accidents involving renewable low and zero-carbon fuels.

Scope: The European Union aims to protect and conserve its marine and freshwater environments by achieving Good Environmental and Good Ecological Status[250]. The upcoming Water Resilience Strategy and the European Oceans Pact further emphasize the need to enhance the resilience of European waters to human-induced pressures. Projects like the Horizon Europe EMERGE have researched the impacts of shipping on marine ecosystems. The introduction of technologies to decarbonize the sector may enable, to a certain extent, to phase-out relevant current sources of water and air pollution. However, renewable low and zero-carbon fuels and procedures pose new risks to marine and other aquatic ecosystems like rivers and lakes yet to be explored and addressed, both from the normal function of waterborne transport[251] and from accidental spills of renewable low and zero-carbon fuels. In addition, other pollution sources can be addressed today[252]. This topic aims to evaluate, forecast, control and mitigate the impact

[249] 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

[250] As per the Marine Strategy Framework Directive and the Water Framework Directive

[251] e.g. new abatement systems, atmospheric deposition and impact of air pollution in waters, etc

[252] Notably antifouling coatings, discharges of hazardous substances from wastewater and spread of invasive species through hulls or ballast water

of waterborne transport on marine and aquatic ecosystems, with a focus on developing and demonstrating innovative abatement and mitigation systems and strategies to mitigate and eliminate, where possible, the harmful impact of waterborne transport in the ocean and inland waters. New technologies and solutions addressing the decarbonization of waterborne transport will be considered, as well as the potential risks and challenges associated with these.

Actions should address all of the following aspects:

1. Evaluate and forecast the environmental impacts of waterborne transport operations on marine, rivers and aquatic ecosystems, in particular regarding the effects of renewable low and zero-carbon fuels (with particular attention to accidental spills) and related technologies. The proposal may include testing and experimental work in relation with spills.

2. Develop and demonstrate effective response scenarios, including the associated abatement technologies and any potential new innovative equipment, for managing uncontrolled releases of renewable low and zero-carbon fuels in marine and inland waters or in port areas, including dedicated specific procedures and operational guidelines.

3. Modelling scenarios on water and air pollution sources from each ship types and services running on renewable low and zero carbon fuels.

4. Develop and demonstrate innovative and cost-effective abatement and mitigation systems and strategies to prevent, eliminate and reduce the harmful impacts of the use of renewable low and zero carbon fuels. Relevant TRL5 demonstration of such systems should be done.

5. Identifying training needs and skills requirements to deploy developed solutions, as well as in relation to the management and use of renewable low carbon fuels in ports and on vessels in marine and inland waters, including relevant emergency response preparedness.

6. Develop and demonstrate solutions that improve the resilience of European waters to climate change, pollution, and other human-induced pressures, and contribute to achieving Good Environmental Status and Good Ecological Status in European waters, as well as the objectives of the future Water Resilience Strategy and the European Oceans Pact.

7. Strengthen stakeholder engagement by involving environmental, industry and academic associations, to foster inclusive, future-focused environmental responsibility through sustainable practices.

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.

DRAFT

HORIZON-CL5-2027-03-D5-18: Enhanced electric operation and battery durability (ZEWT Partnership)

Call: Cluster 5 Call 03-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 20.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 8 by the end of the project – see General Annex B. Activities may start at any TRL.

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

1. Demonstrate autonomy, of at least 150 nm (or 277.8 KM for inland navigation) using electrical storage as the only energy source, while allowing rapid in-route zero-emission replenishment.
2. Increase the power output, providing beyond 5 MW as peak propulsion power with corresponding grid capacity.
3. Improve systems to increase the number charging cycles combined with high-power charging to suit the operation needs of different ship types and services.
4. Identify the operating profiles and business cases for which electric powered shipping will bring significant improvements taking into account the priorities and provisions of the Fitfor55 package, especially FuelEU Maritime, Naiades III, AFIR and RED.
5. Develop solutions fitting different ship types and their operational profiles and provide roadmaps for replication.
6. Address the degradation and failure in specific maritime operating conditions.

7. Improved lifetime and safe use of batteries in waterborne transport by addressing the operation profiles, degradation and failure modes associated with unique waterborne transport operating conditions.

Scope: This topic aims to improve the suitability of fully-battery-electric operation of ferries, short sea shipping, offshore and inland vessels, considering the services they provide, their operation profiles and the possibilities to interact with charging infrastructure. Aspects like increasing the autonomy range of operation and fast charging are a crucial element for short sea shipping and inland routes with short docking periods. Fast charging may also put added strain on batteries in terms of output and durability. Optimization of the onboard electrical architecture and battery chemistry as well as optimized battery monitoring and management systems and more extensive training of crew can to some extent address this challenge. Life cycle aspects should be considered by design in the integration and operation of vessels, as well as the end-of-life of batteries, making sure that operations can be performed during the whole expected life of the vessel. The topic also explores the need to increase the power capability of fully electric vessels, aiming to define scenarios in which the increase of the peak propulsion power is needed to ensure the safety of operations. Proposals should cover the interface between vessels and port operations addressing the regulatory requirements, including operational procedures.

Proposals should address all the following aspects:

- Full scale demonstration of innovative solutions for extended range and extended battery cycles beyond simple scaling up of existing commercial batteries. Solutions to increase the current operational range of electric vessels to at least 150 nm (or 277.8 KM for inland navigation) for short-sea shipping, ferries, offshore of 400-6500 GT vessels, or 86-135 meters for inland river vessels on free-flowing rivers upstream, allowing rapid in route charging and being applicable to representative operating conditions of the chosen ship. Demonstration of the vessel's economic viability in normal operation. Demonstrations should also consider baseline reference which are already state of the art

- Identifying the operational profiles and services that require higher energy output for safe and effective operation, developing solutions and modelling scenarios to ensure safe and efficient energy management and navigation taking into account the battery pack and recharging possibilities.

- Incorporating energy-efficiency measures, including but not limited to, efficient AC-DC grid, thermal management, high voltage electrical components, energy management and energy modelling for optimal operation.

- Implementation of vessel-wide adaptive energy-management solutions that coordinate battery, propulsion and hotel loads, maximising cycle life while minimising emissions.

- Development of solutions for intelligent and optimized battery management to improve energy efficiency and life extension of the batteries. Furthermore, projects should consider

life cycle aspects by design and address the end-of-life of batteries to ensure full electric operation during and beyond the planned operation of the vessel.

- Creating concepts for rapid zero-emission in-route charging, fast charging, offshore charging or battery replenishment, including solutions capable of supplying power to idling vessels anchored offshore near ports, while maintaining desired operating schedules, adhering to current standards.

- Encouraging modular design and ship retrofitting to facilitate replication of the solution, ideally presenting one full retrofit exercise and several replications in similar or different vessels, also including the needs of the OPS infrastructure.

- Development of recommendations and best practices 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. In addition, the recommendations should also consider how integration of the safety considerations affects the overall operational planning and economic assessments.

- The plan for exploitation and dissemination of results should identify adequate business cases and provide roadmap for the replication and deployment of the proposed technology, including plans for scalability, commercialization, and deployment. Proposals should identify and propose opportunities for further market uptake.

- Establishment of strong collaboration between industry, training providers and higher education institutions to develop specialized courses on enhanced waterborne transport battery management.

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. Proposals are encouraged to prioritise shipyards, equipment manufacturers and suppliers located in the EU and EEA.

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-CL5-2027-03-D5-19: Onboard renewable energy solutions and energy saving measures to reduce the fuel consumption of ships by at least 55% (ZEWT Partnership)

Call: Cluster 5 Call 03-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 8.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). Subject to restrictions for the protection of European communication networks.
Technology Readiness Level	Activities are expected to achieve TRL 8 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [253].

[253] 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

Expected Outcome: Project's results are expected to contribute to the following expected outcomes:

1. Full-scale demonstration of the combined solutions aiming to reduce ship GHG intensity and energy savings by at least 55%, compared to 2008 levels.
2. Development of a standardized framework to verify improvements stemming from energy efficiency measures and standardized interfacing with certification of renewable energy solutions to strengthen the implementation of FuelEU Maritime.
3. Explore and establish assessment criteria, and sea-trial procedures for the combination of solutions.
4. Adapt digital solutions towards standardised interface layers (hardware and software) to introduce data-driven optimisation and seamless integration.
5. Facilitate the retrofitting of existing vessels with zero emission energy sources in combination with energy efficiency measures up to 2030.
6. Address the safety and operational impacts on ships, ports and other land infrastructure, as well as training gaps in terms of skills and competencies necessary for the adoption and operation of these technologies onboard ships.
7. Strengthen market confidence in the integration of technologies and ensure sustainability and continuation of project outputs, including the integrated technologies.
8. Address possible trade-offs with air and water pollution (unintended higher NOx or Black Carbon, ammonia dispersion, etc.) linked to decarbonization (technologies and fuels).

Scope: One of the key areas in the waterborne transport domain aimed at enhancing energy efficiency and subsequently reducing emissions of greenhouse gas (GHG) and air pollutants is the exploration, implementation, and assessment of renewable energy solutions and energy-saving measures. To this end, numerous advancements (e.g., electric and hybrid propulsion systems, wind-assisted propulsion technologies, hull optimization, air lubrication systems etc.) have been made across various aspects of ships. However, a high energy-efficient vessel requires addressing specific challenges despite the significant technological advancements. One of the most critical factors relates to the combination and integration of different solutions and measures that may lead to additional energy savings concerning multiple ship elements such as energy conversion, propulsion, onboard energy consumer demands (e.g., hotel loads for passenger vessels, operation equipment for offshore vessels etc.), higher-efficiency conventional or alternative power systems and others without compromising the ship's safety and performance.

Adaptability across different ship types and scalability, particularly for large vessels, are further challenges that require meticulous analysis. The shift towards zero emission entails significant investment costs, especially for small and medium-sized shipping companies, and consideration of financial viability is of paramount importance. Lastly, the absence of a concrete

standardization framework poses a substantial barrier that must be adequately addressed and overcome.

Proposals are expected to address all the following aspects:

1. Full-scale demonstration offering combined reduction of fuel consumption of at least 55% compared to 2008 levels. Proposals should clearly define the baseline, either in case of retrofits or newbuilds, with respect to the ship's existing or expected operational profile.

2. Create a methodology estimating energy savings and reduced GHG intensity and emissions of air pollutants from each technology separately and the aggregated savings of combining these technologies in different scenarios.

3. Design optimization to facilitate deployment on different ship types, with a focus on retrofit cases and replication.

4. Capitalise on existing digital solutions for including energy optimization (e.g., smart control, energy management) and for seamless integration of technologies with the ship's automation and class-certification processes introducing and explore cyber security aspects of the developed solutions.

5. Projects should consider how high amounts of data transfers for monitoring, optimization, and decision-making may pose risks in terms of data integrity, cybersecurity and propose approaches to address those risks.

6. Assessment of environmental and wider benefits, including reduced emissions of air and water pollutants, and underwater noise, as well as cost-effectiveness of the combined solutions considering life-cycle assessment approaches.

7. Focus on safety and operational aspects addressing any technical and operational challenges that may arise from the combination of energy efficiency solutions.

8. Facilitate effective cooperation and joint training between vessel crews, ports, and shore-side emergency services to promote safety preparedness, coordinated response strategies, and best practices.

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. Proposals are encouraged to prioritise shipyards, equipment manufacturers and providers located and/or manufacturing in the EU and EEA.

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.

Transport-related health and environment

Proposals are invited against the following topic(s):

HORIZON-CL5-2026-06-Two-Stage-D5-20: Non-exhaust emissions in road and railway transport

Call: Cluster 5 Call 06-2026 (2-stage) (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of between EUR 3.50 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.
Indicative budget	The total indicative budget for the topic is EUR 7.00 million.
Type of Action	Research and Innovation Actions
Admissibility conditions	The conditions are described in General Annex A. The following exceptions apply: Applicants submitting a proposal for a blind evaluation (see General Annex F) must not disclose their organisation names, acronyms, logos nor names of personnel in the proposal abstract and Part B of their first-stage application (see General Annex E).
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 5-6 by the end of the project – see General Annex B. Activities may start at any TRL.
Procedure	The procedure is described in General Annex F. The following exceptions apply: The first-stage proposals of this topic will be evaluated blindly.

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

- Methods and tools to support measurement, simulation and validation of non-exhaust emissions in road and railway transport

- Estimates on the impact of these pollutants on human health, terrestrial ecosystems and the aquatic environment with particular focus on microplastics and other heavier non-airborne particles

- Delivery of better emission factors for emission inventories and projections, including the European Monitoring and Evaluation Programme (EMEP), also for resuspension, for which little knowledge exists today.

- Recommendations and mitigation strategies including the determination of appropriate KPIs and assessing the effectiveness of control measures with an appropriate cost-benefit analysis to understand the economic and practical feasibility of different emission reduction strategies.

Scope: With continuous increase in electrification of the car fleet and railways, the share of non-exhaust particulate emissions becomes increasingly important. Non-exhaust emissions (NEE) of particles apply to all forms of ground transport and can be categorised as those coming from several sources, such as brake wear, tyre wear, pantograph-catenary wear, wheel-rail contact, road surface wear, as well as vehicle-induced resuspension of road/track dust deposited on the surface. There may be other sources, e.g. engine belts and clutch plates. Quantitative data on the magnitude of non-exhaust emissions are fragmented and highly uncertain, particularly when compared to data for exhaust emissions. Emissions vary widely according to brake, tyre and road surface material, and with driving style. Further research efforts are necessary to increase the understanding of these particles, their creation, ageing and dispersion in the environment.

Moreover, the health impact of NEEs is far less studied, and it remains unclear whether these predominately solid/non-soluble PM may induce the same effects as combustion PM. Additionally, these pollutants has been reported to adversely affect terrestrial systems and aquatic environment; however, it is not clear to what extent.

Research into rail particulate emissions is an equally important area due to its implications for air quality, human health, and environmental impact. However, research data on the health impacts of specific particulate components is limited. Furthermore, comprehensive studies on the chemical composition of rail particulates are scarce. The impact of rail particulates on soil, water, and ecosystems is not well understood, while more data is needed on how particulates disperse and deposit in different environments, especially in urban versus rural areas. Addressing these research gaps would provide a more comprehensive understanding of rail particulate emissions and contribute to the development of effective mitigation strategies.

In order to address the two aforementioned areas (road and rail), R&I actions are expected to address the following aspects:

- Methods and tools for the segregation of NEE particle sources: i) during particle collection (e.g., due to high background concentrations), ii) attribution of collected material to different sources. Appropriate real-world test conditions, equipment and sampling methods for the evaluation of particles (e.g., separation of total and solid particles)

- Source identification and characterization including detailed source apportionment (brake wear, tyre wear, wheel-rail interaction, resuspension, etc.) and chemical composition;
- Assessment of the influencing parameters: use cases (e.g. different vehicle types or tyre types), conditions (e.g. urban, rural, motorways, tunnels), driving behaviour, state of the road surface or rail tracks; attribution and distribution;
- Emission Measurement Techniques including but not limited to standardized measurement methods and real-time monitoring;
- Downstream assessment: analysis of the deposited material in the environment, assessment of its decomposition, aggregation, dispersion and degradation;
- Health Impact estimates building on existing toxicology studies and long-term exposure effects supported by gender disaggregated data collection and intersectional analysis;
- Estimates on the environmental impact on soil, water, and ecosystems as well as deposition patterns (i.e. how particulates disperse and deposit in different environments, especially in urban versus rural areas.)
- Mitigations through focusing on State-of-the-Art systems: test systems (including the vehicle e.g., vehicle-lightweight technologies) that can mitigate non-exhaust emissions to reach TRL 6 or higher, innovative tyre and brake designs and materials that balance durability, safety, and reduced abrasion, innovative road surfaces and texture (considering the interaction between tyre and road), runoff and drainage systems. For the railway sector mitigation solutions could include test systems addressing emissions from key mechanical interfaces (e.g., braking and wheel–rail contact), vehicle innovations to reduce wear-related emissions, and infrastructure measures such as optimized track materials, surface treatments, and improved drainage and containment systems. Consider life cycle assessment for the analysis of the systems
- Support standardization and regulation based on the recommendations in support of industrial competitiveness

Proposals should take into consideration the results of previous EU funded projects such as Leon-T, ULTRAHAS, nPETS or any other similar projects.

HORIZON-CL5-2027-03-D5-21: Assessing the effect of airport operations on air quality and noise in nearby communities

Call: Cluster 5 Call 03-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 7.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 5-6 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [254].

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

- Assessment of the impact of airport operations on air quality and water bodies through air quality measurements and monitoring at different spots in and around the airports as well as through in vitro testing and/or remote sensing for water quality in airports close to water bodies

- Contributing to the delivery of better emission factors for emissions inventories and projections (including EMEP), especially for species and fuel mixtures for which little knowledge exists today in order to support local, regional, national and international emissions reduction plans (e.g. Noise Plans, Air Quality Roadmaps, Air Quality Plans, national Air Pollution Control Programmes, as mentioned in EU acquis) by providing real-world emission information and measuring the actual impact of control measures and strategies.

[254] 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

- Recommendations for improved measurement certification and testing to better cover real world situations.

- Develop a methodology to assess the health impact (both the nature, seriousness and number of people at risk) of the measured pollutants and noise in airports or at the nearby urban environment and apply it to the test sites.

Scope: Aviation emissions not only have an impact on climate change and on GHG emissions but also on-air quality as it is recognized that airport-related sources of emissions release pollutants that can contribute to the degradation of air quality of their nearby communities. As such, air quality and noise issues in the vicinity of airports need to be investigated, quantified and addressed. Airports operations can generate water pollution due to their extensive handling of jet fuel and de-icing chemicals, which, if not contained, can contaminate nearby water bodies. Similarly, attention must be given to other possible airport-related environmental impacts associated with noise, water quality, and local ecology in the vicinity of airports.

In order to address these issues, the following R&I actions should be undertaken:

- Comprehensive real time and real-world measurements of pollutant (exhaust and non-exhaust) and noise emissions. The sources of emissions should be differentiated, and the pollutants identified. Operations should include ground operations, landing and take-off (including emissions from tyres and brakes) and assessing exhaust emission during cruising, including impact of changes in flight altitude on engine performance parameters (stationary engine tests). The calibration of the measurement systems and the reproducibility of the results should be demonstrated.

- Pilot testing in 2 different airports (possibility as well for testing on other complex transport nodes) for proof of concept with the aim of increasing scalability and replicability for other similar environments. Proposals are expected to select specific airports that are in vicinity of urban/rural communities and close to water streams/bodies, to examine and quantify the effect of airport emissions on air quality, noise and water bodies.

- Investigation of the adverse health and environmental effects of particle emissions, NOx, and non-regulated emissions (e.g. black carbon, tyre and brake particles, secondary organic aerosols, etc.) generated from aircraft and airport operations. The analysis should be supported by gender disaggregated data collection and intersectional analysis.

- Estimates of the impact of APUs (Auxiliary Power Unit) or GPUs (Ground Power Units) to stationary aircrafts' emissions (GHG, air pollutants and noise) compared to conventional operation.

Proposals should consider the results from previously EU funded projects such as AVIATOR, nPETS, TUBE, ANIMA , NEEDED or any other similar projects.

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. Improved mobility for people and goods in all weather conditions, ensuring safe, shared, inclusive, affordable, attractive, and accessible door-to-door mobility, for private and public transport in mixed traffic and confined areas, as well as open roads.
2. Seamless integration of CCAM solutions into existing transport ecosystems to ensure interoperability, promote multimodality, enhance traffic safety, catering to diverse user needs and behaviours.
3. Resilient, climate-neutral, and sustainable mobility solutions with reduced carbon footprints, resulting in greener, less congested, cost-effective, and demand-responsive transport systems.
4. Increased competitiveness of the transport system using secure and hyper-advanced technologies such as real-time perception, situational awareness, and decision-making systems, based on trustworthy Artificial Intelligence (including Edge and Generative AI), satellite navigation, smart traffic management, and tools for software development for CCAM applications.

Multimodal and sustainable transport systems for passengers and goods

1. Enhanced resilience of transport networks through improved operational efficiency for both passenger and intermodal freight transport, future-proofed mobility systems supporting EU competitiveness while ensuring affordable and accessible transport for all passengers.

Safety and resilience

1. Drastic reduction in road fatalities for all types of users, especially on rural areas
2. Improved resilience of the public transport system via the use of AI
3. Advanced technologies and methods for improved reliability in complex environments for aviation

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Connected, Cooperative and Automated Mobility (CCAM)

Proposals are invited against the following topic(s):

HORIZON-CL5-2026-10-D6-01: Flagship-pilot: large-scale demonstrations of CCAM (CCAM Partnership)

Call: Cluster 5 Call 10-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 100.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 100.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B.

Expected Outcome: This flagship pilot is the culmination of the entire activity catalogue carried out by the CCAM Partnership since its launch in 2021. It will combine in one project the most promising CCAM use-cases across three key domains, with the technological advancements from all its R&I clusters[255] supporting and enabling CCAM systems and services towards market uptake.

This action is expected to contribute to all the following outcomes:

- Large-scale demonstrations of inclusive, user-oriented, and well-integrated CCAM systems and services for people and goods in mixed traffic through Field Operational Tests (FOTs), Technology Pilots, and Living Labs, building upon advanced and emerging SAE Level 2 systems to move towards SAE Level 3 and 4 functionalities, at multiple test sites and corridors showcasing CCAM potential[256], for a minimum of 12 months.

255 https://www.ccam.eu/our-actions/clusters/

256 Such as previous experience in testing, developing and deploying CCAM services.

- Validation of enabling technologies that facilitate the extension of Operational Design Domains (ODDs) in large-scale operations and enhance perception performance under poor lighting and adverse weather conditions in large-scale demonstrations and pilots. Assessment of deployment readiness and demonstration of technological maturity focusing on their reliability, security, and real-world applicability.

- Identification of the remaining technological and societal development needs to accelerate deployment and drive user and societal demand. These demonstrations will strengthen the connection with users and society through a co-creative process, ensuring that technological developments align with real-world needs and societal expectations.

- Recommendations for regulatory action aimed at facilitating the deployment of Automated Vehicles (AVs) in Europe, by engaging with relevant policy and regulatory bodies.

- Identification and selection of viable business models for each of the use-cases explored per domain, aiming for continued operation after the flagship pilot through private investment or national/local public funding including mechanisms for transferability and replicability to enable a broader application of results to other cities and regions.

Scope: CCAM solutions are expected to provide a more user-centred, inclusive mobility system that enhances safety, reduces congestion, lowers harmful emissions, and contributes to decarbonization. In addition, CCAM solutions enhance transport effectiveness, thereby strengthening Europe's competitiveness in the global mobility sector. Novel mobility services can enable seamless integration with existing services such as public transport and logistics, while higher levels of automation are expected to boost transport productivity and efficiency. However, the benefits of these solutions must be proven through large-scale demonstrations, validating their effectiveness for both people and goods. It is also of key importance to integrate and test enabling vehicle technologies and to validate trusted communication and cyber security, as well as real time information transmission . Moreover, a comprehensive assessment of technology maturity is necessary, evaluating the readiness of automated driving functions within mixed traffic conditions and in confined areas. This evaluation helps determine the readiness of automation technologies for deployment, considering factors such as operational reliability, regulatory compliance, and user acceptance. By fostering a systematic approach to large-scale demonstrations, technology validation, and maturity assessment, and by prioritising zero-emission mobility, these efforts contribute to the seamless integration of CCAM solutions across the entire transport ecosystem.

The proposed action is expected to **demonstrate** different CCAM solutions and technologies in all the following domains:

- **Individual mobility** within mixed traffic environments, encompassing urban, suburban, motorway, and rural settings, with a focus on the seamless integration of automated and conventional vehicles. Use cases should consider diverse road conditions, infrastructure variability, traffic dynamics, and user needs, ensuring safe, efficient, and user-centric mobility solutions. A key aspect is the integration of advanced technologies (e.g. AI, V2X,

cybersecurity, precise positioning, etc.) and the validation of technological enablers ensuring that automation solutions are robust, scalable, and adaptable to all CCAM use cases for people and goods.

- **Shared mobility** and **public transport** operations in urban, regional and rural areas, for end-to-end journeys aiming to enhance safety, accessibility, equity, and sustainability, including improving business cases for mobility providers. Validate realistic door-to-door mobility services including links to mobility hubs, ridesharing and parking areas to enhance end-to-end journeys in urban areas and regions.

- **Freight transport** for hub-to-hub, corridors, and **logistics** hubs on public roads and confined areas, integrating logistics, fleet and terminal operators. Validate realistic end-to-end use cases, such as logistics hubs at airports, ports, cross-border, and transhipment terminals, connecting use-cases in confined operations with TEN-T freight corridors.

Where relevant, intersecting social factors, such as gender, age, social origin and income level should be considered. All new vehicles acquired for the project's activities, as well as all vehicles participating in final demonstrations conducted in public spaces, are expected to be environmentally friendly, with a special focus on electric vehicles, to maximise synergies and ensure the future integration of solutions into the sustainable mobility mass market.

The proposed action should integrate all the following **common activities** across domains:

- Ensuring close coordination and synergies with innovation actions planned under the European Connected and Autonomous Vehicle Alliance, (ECAVA), in particular the Autonomous driving technology roadmap, announced by the European Automotive Action Plan.

- Leveraging on the Coordination and Support Action, *HORIZON-CL5-2025-01-D6-02: Preparing for large-scale CCAM demonstrations.*[257]

- Leveraging on the Coordination and Support Action *HORIZON-CL5-2024-D6-01-05* Robust Knowledge and Know-How transfer for Key-Deployment Pathways and implementation of the EU-CEM.[258]

- Ensuring close coordination with HORIZON-CL4-2026-04-DATA-01: *Demand-side 3C pilot demonstrators on converged Telco Edge Cloud Infrastructure*, in particular the pilot demonstrator on unlocking telco-edge-cloud functions for the mobility ecosystem.

- Ensuring inclusive engagement of all key European private stakeholders (e.g., shared mobility, public transport and logistics operators, infrastructure providers, associations, SMEs and start-ups, in particular technology developers), and notably a broad representation of the European OEMs, in addition to Tier-1 suppliers, as well as public players (e.g., municipalities/cities/regions, motorway operators, emergency service

257 https://cordis.europa.eu/programme/id/HORIZON_HORIZON-CL5-2025-04-D6-02
258 https://cordis.europa.eu/project/id/101203053

operators, public transport authorities, research institutions) and community groups (e.g., user groups) for the transport of people and goods, across their entire value chain, in the designated domains. Each of these shall contribute to European technological innovation, sovereignty and competitiveness and none shall contrive the security and/or public policy interests of the Union.

- Assessing the transferability, adaptability, and scalability of advanced technologies such as photonics and Generative AI as key enablers for the extension of ODDs, ensuring broad deployment potential.

- Executing public engagement and awareness campaigns to increase societal readiness and promoting the use of CCAM as well as implementing CCAM education and training programs.

- Assessing the degree to which the demonstrated services comply with current regulatory requirements and providing recommendations to ensure full compliance.

Bringing forth real-world evidence on the effects, impacts, and long-term implications of integrating mixed CCAM solutions into the mobility system including long-term impact for users.

- Exemplifying concrete and strategic benefits of vehicle-vehicle or vehicle-infrastructure cooperation to improve safety, optimize traffic flow, and enhance the overall efficiency of CCAM transportation networks considering both digital and physical infrastructure and including guidance for remote operations and management.

- Using data from large-scale demonstrations to identify and extract pertinent scenarios and edge cases, ensuring these insights are systematically integrated into related databases for validation scenarios, while also exploring data sharing opportunities with relevant authorities.

- Facilitating the interoperability of connected and automated systems across vehicle brands, regions, and Member States and Associated Countries, taking into consideration different traffic environments and road densities, also in line with the Automotive Action Plan on large-scale cross-border testbeds.

- Encouraging collaboration with the European Software-defined Vehicle (SDV) initiative by adopting existing interfaces and proposing new ones developed within the project for potential inclusion in the SDV framework.

This topic requires the effective contribution of SSH disciplines and the involvement of SSH experts and 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.

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 funded under this topic are expected to build strongly upon, and collaborate closely with, the CSA resulting from HORIZON-CL5-2025-04-D6-02[259], "Preparing for large-scale CCAM demonstrations", ensuring that the implementation of their activities and findings aligns with the strategic direction outlined in the CSA.

Projects resulting from this topic are expected to apply the European Common Evaluation Methodology (EU-CEM) for CCAM[260].

HORIZON-CL5-2026-10-D6-02: Geopolitical competition and socioeconomic resilience in CCAM: an innovation and policy roadmap for EU leadership (CCAM Partnership)

Call: Cluster 5 Call 10-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 4.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). Subject to restrictions for the protection of European communication networks.
Technology Readiness Level	Activities are expected to achieve TRL 5-6 by the end of the project – see General Annex B.
Legal and financial set-up of	The rules are described in General Annex G. The following exceptions apply:

259 https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/HORIZON-CL5-2025-04-D6-02?keywords=ccam&isExactMatch=true&status=31094501,31094502,31094503&frameworkProgramme=43108390&order=DESC&pageNumber=1&pageSize=50&sortBy=relevance

260 See the evaluation methodology here.

the Grant Agreements	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) [261].

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

- Assessment of Europe's CCAM position in global competition, identifying strategic vulnerabilities, dependencies and opportunities across business models, supply chains, critical components, technological capabilities, infrastructure, and regulatory frameworks, supported by advanced AI-driven analytics and innovation mapping tools.

- Stakeholder-driven, participatory future scenarios and strategic pathways that define Europe's leading role in the evolving geopolitical, technological, and economic landscape of CCAM. These should be developed using advanced foresight methods, complemented by iterative validation through a minimum of 3 dedicated Living Labs selected to represent diverse European regions, urbanisation levels, and governance capacities, ensuring a structured, robust, and anticipatory approach to long-term decision-making.

- A data-driven understanding of the socioeconomic effects of different CCAM deployment pathways, based on a quantified assessment across Member States and Associated Countries, economic sectors, and demographic groups, at national and cross-national levels, using innovative, integrated economic-transport modelling that captures dynamic interactions, systemic feedback loops, and long-term impacts. Socioeconomic effects may include, but are not limited to, employment and growth aspects, equity, and transport poverty.

- Robust governance models, policies and business strategies (including for SMEs and micro-enterprises) that strengthen Europe's leadership, economic resilience, and market positioning in CCAM, developed through interdisciplinary methods combining policy analysis, institutional diagnostics, and scenario-based stress testing, to ensure robustness under diverse future geopolitical and economic conditions. These should identify viable business cases, recommend sectoral R&D priorities, and support innovation scaling for both public and private entities. Additionally, they should ensure long-term adaptability to geopolitical and market uncertainties, promote equitable growth, reduce external dependencies, and mitigate supply chain vulnerabilities, all while promoting sustainable growth.

[261] 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

- Ensuring close coordination and synergies the European Connected and Autonomous Vehicle Alliance (ECAVA), in particular the autonomous driving roadmap, announced by the European Automotive Action Plan.

Scope: CCAM is a key area of global competition and one of the five pillars of the European Automotive Action Plan for the automotive sector, aimed at helping the industry regain its leadership in the shift towards smarter (AI-powered), cleaner, and more connected vehicles, However, CCAM deployment is shaped by evolving geopolitical dynamics, rapid technological advancements, and economic uncertainties. Europe must secure its leadership in CCAM and strengthen its socioeconomic resilience by continuously addressing vulnerabilities and identifying robust pathways for policy development and market deployment. This topic will assess the global geopolitical landscape of CCAM innovation, map future pathways, and develop evidence-based strategies for policymakers, businesses, and investors. The results will support robust, future-proof policies, business strategies, and investment frameworks, ensuring a resilient, inclusive, and competitive European CCAM ecosystem.

Proposed actions are expected to address all of the following aspects:

- Conduct a comprehensive geopolitical and economic analysis of CCAM to map Europe's strategic position in global competition. Identify vulnerabilities, dependencies and opportunities in business models, supply chains, critical raw materials, technological capabilities, digital and physical infrastructure, validation processes, safety benchmarks, and pricing strategies, supported by AI-driven analytics and innovation mapping tools. The analysis should also assess large-scale CCAM initiatives worldwide, identifying scaling trajectories, tipping points, commercialization barriers, and success factors. These insights should inform strategic policymaking, investment decisions, and Europe's regulatory positioning in global CCAM markets.

- Develop novel, stakeholder-driven participatory future scenarios to explore plausible geopolitical, technological, and economic developments affecting CCAM, and define associated transition pathways toward desirable European futures that ensure resilience, strategic autonomy, and competitiveness. Use advanced foresight methods, complemented by iterative validation through a minimum of three dedicated Living Labs, to understand trade-offs, assess risks, and define strategic priorities under different global conditions. The project should also identify KPIs that capture European added value, unique selling points, and global market positioning, and apply these to assess and guide CCAM competitiveness The project should also identify KPIs that measure the European added value, its unique selling points and global market positioning, to apply these KPIs to define CCAM competitiveness.

- Assess the socioeconomic impacts of different CCAM deployment pathways, focusing on economic, employment, and social equity dimensions. Analyse income growth, employment effects, regional economic convergence, and productivity gains using integrated economic-transport modelling approaches that account for dynamic interactions and systemic feedback across Member States and Associated Countries, economic sectors,

and demographic groups. Identify potential disparities and propose policy recommendations and investment strategies to ensure that CCAM contributes to inclusive, equitable, and sustainable economic growth across all regions of Europe. This should include an evaluation of how CCAM deployment can reduce Europe's reliance on external supply chains, while enhancing industrial competitiveness.

- Develop robust policy recommendations, governance models, and business strategies informed by institutional diagnostics and tested under diverse future conditions through scenario-based stress testing to reinforce Europe's leadership and economic resilience in CCAM. Ensure regulatory alignment with global standards, strengthen supply chain resilience by reducing reliance on non-EU dependencies, and promote an open yet competitive market environment. Business strategies should identify viable business cases, recommend sectoral R&D priorities, and support innovation scaling, particularly for SMEs and micro-enterprises. Policies and strategies must be adaptable to shifting geopolitical and economic conditions, securing Europe's long-term market competitiveness and technological sovereignty.

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.

Projects funded under this topic are expected to collaborate with the CCAM Technology Observatory by exploring and leveraging complementarities between their respective activities and findings[262].

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[263].

HORIZON-CL5-2026-10-D6-03: Generative AI for smarter CCAM: enhancing perception, decision-making, and validation (CCAM Partnership)

Call: Cluster 5 Call 10-2026 (WP2026-2027)
Specific conditions

[262] Currently under preparation in collaboration with the Joint Research Centre, to be launched in 2025 with expected operational capacity in 2026.

[263] See the evaluation methodology here.

Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 14.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). Subject to restrictions for the protection of European communication networks.
Technology Readiness Level	Activities are expected to achieve TRL 5-6 by the end of the project – see General Annex B.
Legal and financial set-up of the Grant Agreements	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) [264].

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

- Availability and integration of advanced, trustworthy, energy-efficient perception systems, exploiting technological advancements of Generative AI (GenAI) to enhance situational awareness and support safe decision-making;
- Enhanced Vulnerable Road User (VRU) safety, based on elevated, more temper-proof perception and understanding of their behaviour and intention predictions;
- Enhanced robustness of CCAM systems - both on-board and on the infrastructure side - in critical situations due to their training, virtual testing and validation in scenarios

[264] 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

generated by GenAI, complementing existing scenario databases for the testing and validation of CCAM systems;

- Utilisation of distributed computing resources (at the edge, on board, at infrastructure or back-office), facilitating real-time processing and analysis to improve system responsiveness and safety, while building enhanced understanding of the relevance and limitations of using GenAI for CCAM;

- Tools and harmonised approaches for the use of GenAI in mobility technology development, training and validation, as well as for systemic applications such as traffic management and remote control, integrating them into existing approaches.

Scope: Pilots and demonstrations using Level 3 and 4 vehicle services face major challenges in perception and decision making, highlighting the necessity for low-latency solutions that enhance responsiveness and situational awareness in real-time operating conditions. This is especially relevant for driving in more complex environments like urban areas, where environmental variance is higher and where new scenarios can be regularly encountered. Furthermore, there is the need to limit the latency, bandwidth and energy use for on-board calculations, as well as the need to enhance the security, privacy and reliability (e.g. scene understanding and prediction of near-future scenario development). For rapid decision-making in interactions with VRUs, this is essential for implementing CCAM-enabled solutions and ensuring scalability.

At the same time, developments of sector-agnostic technologies show advancements -such as GenAI- that can be beneficial for CCAM. First exploratory steps can be expected from a project funded under HORIZON-CL5-2023-D6-01-02 [265] regarding the potential in the virtual generation of edge cases, which could be used for the development, training, virtual testing and validation of CCAM systems.

Further advancements in GenAI applications specifically for the CCAM domain need to be developed, trained and validated[266]. Thus, proposed actions shall include approaches to scale and exploit further technological advancements for CCAM. Major steps are needed to advance to highly advanced, ultra-safe, trustworthy and energy efficient real-time perception and decision-making systems for automated vehicles, specifically focusing on scalable solutions and the exploitation of GenAI. These advancements should leverage low latency systems or distributed computing resources to facilitate real-time processing, thereby improving system responsiveness and safety. This topic will thus contribute to the AI Continent Action Plan[267] by fostering AI development and adoption in the automotive sector.

Proposed actions are expected to address all the following aspects:

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265 https://cordis.europa.eu/project/id/101146542

266 This topic also encourages alignment with national projects and initiatives to allow building up of existing efforts and solutions.

267 https://digital-strategy.ec.europa.eu/en/library/ai-continent-action-plan

- Development of tools and approaches for robust environment perception and decision making (at the edge, on-board, at infrastructure or back-office). These approaches shall aim at accelerating and advancing the reasoning of decision making, increasing the level of efficiency, (cyber)-security and reliability of the applications, with path planning as initial use case. This is to support amongst others the perception of VRUs, the prediction of their behaviour and their intentions, and includes data sharing approaches for CCAM solutions to create a larger time window for actions in near accident scenarios. The use of advanced GenAI, including Large Language Models (LLMs), Vision Language Models (VLMs) or Vision Language Action (VLAs) can significantly enhance these capabilities by leveraging their advanced contextual reasoning and pattern recognition. Furthermore, GenAI can complement traditional reinforcement learning (RL)-based agents by improving sensory input interpretation and providing enriched environmental contexts, which enhance decision-making and adaptability.

- Scenario generation of interactions of CCAM enabled vehicles with other road users, which is essential for advances in validation and testing, extending existing datasets and scenarios as GenAI can, based on existing data, deliver variations of scenarios (e.g. cultural differences of road users and infrastructure variability.)

- Integration of GenAI technologies into existing approaches (development, training and validation) for their further enrichment. Understanding the limits of using GenAI technologies as well as the benefits and develop guidelines for valid approaches for this integration (including consideration of gender biases and fairness to ensure AI systems are transparent and accountable) and providing an outlook on the uptake of the tools and approaches developed can be done for a variety of CCAM components and technologies, as well as for systemic applications such as traffic management and remote control.

- Encouraging collaboration with the European Software-defined Vehicle (SDV) initiative by adopting existing interfaces and building blocks, and proposing new ones developed within the project for potential inclusion in the SDV framework.

Proposed actions should include measures to ensure close coordination with the European Connected and Autonomous Vehicle Alliance (ECAVA) announced in the European Automotive Action Plan.

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 funded under this topic are expected to liaise with the ADRA Partnership in order to explore and leverage complementarities between their respective activities and findings.

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Projects resulting from this topic are expected to apply the European Common Evaluation Methodology (EU-CEM) for CCAM[268].

HORIZON-CL5-2027-06-D6-04: Holistic solutions for CCAM integration in critical scenarios (CCAM Partnership)

Call: Cluster 5 Call 06-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 6.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). Subject to restrictions for the protection of European communication networks.
Technology Readiness Level	Activities are expected to achieve TRL 5-6 by the end of the project – see General Annex B.
Legal and financial set-up of the Grant Agreements	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) [269].

[268] See the evaluation methodology here.

[269] 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

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

- Detailed clustered collection of critical use cases and scenarios based on the findings of former or current national and international research projects, as well as the identification of missing aspects.
- In-depth analysis of stakeholders that may be affected by critical situations and edge cases and that have high interest and/or influence in resolving these situations through their capabilities.
- Availability of real-time holistic situation interpretation services addressing the respective needs of road users of all kinds, road operators, service providers and related perspectives, as well as its social participation and technological integration, i.e. the role of each technological component in the overall system-of-systems.
- Availability of a "local deconflicting CCAM architecture" that detects and deconflicts corner case situations (automatically through active and passive technologies or by including remote operation techniques). This includes the capability from online calculation of optimal countermeasures to ensure safety, and reduce any negative impacts on all road users, by considering available infrastructure (including also automated and connected digital components, like sensors, intelligent traffic control systems, cooperative communication), and overall conditions. Such an architecture also needs to address relevant requirements, particularly in technology and near and far communications, outlining the technical standards and investments necessary for risk mitigation. These may include solutions to increase road users' situational awareness and the provision of reliable, accurate and timely warnings.
- Establishment of working methods and harmonization of interfaces with national/local road authorities, operators and emergency services (e.g. first responders in case of accidents), including remote operations and road enforcement. The aim must be the creation or adaption of decision-support tools that can be integrated with mobility platforms, traffic control systems, and emergency services. This also includes the definition of related shared governance models. Understanding of the requirements for public road authorities (national and local) to address CCAM critical cases, defining their role in supporting and enabling CCAM operations.
- Enhanced user acceptance through holistic CCAM solutions addressing their individual needs and requirements as e.g. road user, customer, operator, service provider, etc., in terms of trust, safety, security, etc.

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Scope: Based on the preliminary and final findings of HEADSTART[270], SUNRISE[271], EVENTS[272], ROADVIEW[273] and SYNERGIES[274] (among others), this call is focussing on CCAM solutions for critical cases, specifically situations and events that are less regular and of higher risk. These cases may also include emergency conditions and unplanned events, on local and on larger (regional, national, European) scale, such as extreme weather conditions, road incidents, cyberattacks, traffic disruptions, and sudden loss of coverage of the Operational Design Domain (ODD).

CCAM operations may be disturbed under multiple scenarios, and can vary according to the type of road, road attributes, traffic conditions, available infrastructure and technology, malfunctions, incidents, etc. Depending on the specific circumstances and the dimension of the disturbance, the impact on CCAM operations and involved agents (e.g. road users, vehicles, VRUs, infrastructure components, emergency services, operators) may vary. According to the case and the dimension of the incident, different entities and actors of the CCAM system (and even beyond, e.g. regulatory bodies and emergency and crisis response centres) are involved and may need to take part to resolve these events in a resilient, safe and secure way.

This call adopts a holistic approach, investigating critical cases not only from technological/infrastructure or vehicle-related perspectives (e.g., edge cases for automated vehicles) but also from the viewpoint of the user, customer, service provider, authority, city, etc. In particular, the focus is on how the CCAM system addresses and mitigates potential negative consequences of such events, including safety risks, emissions, loss of trust, and similar impacts. Proposed actions are expected to address all of the following aspects:

- Development of a clustered list of critical scenarios, impacted entities, role and relation of all stakeholders, the estimated impact and the optimal kind of CCAM-based countermeasure.

- Development and testing of tools and services for the detection of critical situations and edge cases, also based on the tools and approaches for robust environment perception done in HORIZON-CL5-2026-05-D6-02.

- Development and testing of CCAM-based countermeasure solutions. Where applicable, the use of artificial intelligence methods and digital infrastructure support should be considered, aligned also to the tools and approaches for robust decision making done in HORIZON-CL5-2026-05-D6-02. The solutions also should reference common EU Emergency Response Protocols, e.g. for first responders. Also, the creation of decision-support tools and the integration of those into mobility platforms, traffic control systems, and emergency services must be considered. In general, customer/user understanding and trust in the CCAM system is crucial in the adoption of a new service. In building trust, it

270 https://www.headstart-project.eu/
271 https://ccam-sunrise-project.eu/
272 https://www.events-project.eu/
273 https://roadview-project.eu/
274 https://synergies-ccam.eu/

is vital to take into consideration the user perspective and investigate how critical cases can be managed in a way that is effective for the improvement of customer perception.

- Validation and evaluation of solutions in terms of resulting risk reduction and potential negative impacts of critical cases. Solutions will need to be targeted against the scenarios identified and the stakeholders affected and would aim to either eliminate the risk to the service resilience or reduce its likelihood and impact as far as reasonably practicable. This also includes the quantification of the impact, which may also be deduced by using simulation. In addition, also the integration of the solutions into existing platforms needs to be validated in relevant environments (TRL 5). The outcomes of this call are expected to feed into future CCAM demonstrations.

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.

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[275].

HORIZON-CL5-2027-06-D6-05: European CCAM knowledge hub and tools for safe and scalable deployment (CCAM Partnership)

Call: Cluster 5 Call 06-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 4.00 million.
Type of Action	Coordination and Support Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of

[275] See the evaluation methodology here.

	Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). Subject to restrictions for the protection of European communication networks.
Legal and financial set-up of the Grant Agreements	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) [276].

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

- Extended EU-wide Knowledge Base with tools supporting the safe and practical deployment of CCAM in Europe, identifying business needs and trends, including exploitation and maintenance plans to ensure the long-term availability and usage of the Knowledge Base.
- Enhanced exchanges and cooperation among CCAM stakeholders (in particular public authorities, citizens and user groups) in Europe and with countries beyond Europe on R&I and deployment topics of common interest.
- Strengthened exchanges between EU Member States and Associated Countries and coordination with a possible future Important Project of Common European Interest (IPCEI) on CCAM as referred to in the Automotive Action Plan.
- Accelerated implementation of practical safety assessment approaches and procedures from current validation projects across Member States and Associated Countries, reusing Acceptable Means of Compliance (AMC) concepts and respecting the specific integration aspects and legal conditions per MS.
- A secure application exchange platform that enables applicants and Member States and Associated Countries to collaborate in obtaining open road-testing permits.
- EU-wide federated scenario database[277] for the validation of CCAM systems linked to European in-depth accident databases.

[276] 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

[277] https://synergies-ccam.eu/

Scope: Several coordination and stakeholder concertation tools have been established to support the alignment and international outreach of CCAM projects. The FAME project developed a European framework for CCAM testing, evaluation and data sharing and managed the EU-wide Knowledge Base that consolidates information related to CCAM R&I and testing based on results from European and national projects, aiding researchers, policymakers, and industry professionals The platform will be extended in the project funded under the call HORIZON-CL5-2024-D6-01-05[278] to address public authorities and citizens.

Regular events such as the European Conference on Connected and Automated Driving (EUCAD) and EUCAD symposia, international outreach activities and interactions with the Member States Advisory Group (SRG), extend the work of the CCAM Partnership and facilitate and support international dialogues to exchange knowledge and align activities across Europe and globally, at research and regulatory level.

The purpose of this exchange and alignment is to address and overcome barriers to the deployment of Automated Vehicles (AV) in Europe. Since 2022, Europe has introduced several regulatory developments aimed at facilitating the rollout of highly automated vehicles. The Implementing Act for Automated Driving Systems 2022/1426, the amendment to the Delegated Regulation 2022/2236 on type-approval, as well as the UNECE WP.29 Working Party on Automated/Autonomous and Connected Vehicles (GRVA) have all proposed frameworks and methods to ensure the safety of CCAM systems on the road. Despite these advances, a major challenge persists: the fragmented regulatory landscape for CCAM in Europe, which continues to hinder large-scale deployment. The FAME[279] and Hi-Drive[280] projects are working on recommendations for a harmonized open road-testing framework. Projects like HEADSTART[281], SUNRISE[282], and SYNERGIES are operationalizing the UNECE New Assessment/Test Method for Automated Driving (NATM) scenario-based approach. The project funded by call HORIZON-CL5-2024-D6-01-02[283] will extend the safety assurance framework (SAF) with 'In-Service Monitoring and Reporting' post-deployment. Coordination mechanisms are essential as Member States update regulations to align perspectives and support common approval procedures.

Proposed actions are expected to address the following aspects:

- Extend the EU Knowledge Base with practical tools that support safe deployment, not only supporting researchers, policymakers, and industry professionals, but also addressing public authorities and citizens, to establish and prepare the implementation of a long-term sustainability plan for structure.

- Accelerate the exchange and cooperation between relevant European and international stakeholders, including Member States and Associated Countries, with the purpose to

278 https://cordis.europa.eu/project/id/101203053
279 https://cordis.europa.eu/project/id/101069898
280 https://cordis.europa.eu/project/id/101006664
281 https://cordis.europa.eu/project/id/824309
282 https://cordis.europa.eu/project/id/101069573
283 https://cordis.europa.eu/project/id/101203230

accelerate deployment. This by means of co-organizing high-level events such as the EUCAD conference and to coordinate with a large-scale cooperation (such as an IPCEI).

- Develop and implement practical safety assessment procedures, as well as a framework for the secure exchange of applications for open road-testing permits across European Member States, with acknowledgement for specific MS regulations and context.
- Support the realization of EU-wide federated scenario databases, with European in-depth accident databases.

Multimodal transport, infrastructure and logistics

Proposals are invited against the following topic(s):

HORIZON-CL5-2026-10-D6-06: Increasing competitiveness and resilience of multimodal freight transport and logistics for competitive supply chains

Call: Cluster 5 Call 10-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 21.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B.
Legal and financial set-up of the Grant Agreements	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

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	Research and Training Programme of the European Atomic Energy Community (2021-2025) [284].

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

- Advanced tools and solutions are developed and demonstrated to enhance the competitiveness of European multimodal freight transport networks, ensuring sustainability, resilience, security and increased freight transport capacity;
- Solutions provide real-time visibility, tracking and predictive analytics for multimodal services, performance, and network status (e.g., disruptions, maintenance) to support better planning and increase shippers' adoption of multimodal transport;
- Strengthened integration of multimodal (e.g. rail, inland waterway transport and short sea shipping) data, along with improved synchromodal solutions, enabling more agile, flexible, responsive and resilient multimodal transport logistic systems.

Scope: Freight transport demand in Europe is expected to double in the coming decades, making it essential to enhance the capacity, efficiency, and resilience of freight transport to maintain the European competitiveness. Despite policy goals to strengthen multimodal transport, double rail freight's share by 2050, and increase transport by inland waterways and short sea shipping by 50% by 2050, unimodal road transport remains more competitive, and the growth of multimodal freight has been limited.

The lack of integration of rail, inland waterways and multimodal data into logistics and supply chain solutions is one of the main barriers, hindering the efficient and competitive adoption of multimodality. Furthermore, improving system resilience requires better tools and solutions for multimodal operators to manage disruptions and ensure supply chain continuity.

Building on the results of previously funded research projects and initiatives (including e.g. the Europe's Rail Joint Undertaking), proposals should address all of the following aspects:

- Building on data governance models set in the European Data Act, Common European Data Spaces and the electronic Freight Transport Information Regulation, develop interoperable tools and solutions integrated in existing platforms and solutions (also leveraging the full potential of e.g. Artificial Intelligence, Internet of Things and other emerging technologies) used by shippers, carriers, freight forwarders, warehouse operators, distribution centres, retailers and e-commerce platforms to connect with multimodal information (e.g. services, visibility, ETA, etc.). Developing any type of digital platform or similar is outside the scope of this topic. The proposed tools and

[284] 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

solutions should also help operators to react rapidly to disruptions, considering strategies and alternatives for cases of failure, accidents, sabotage, force majeure, etc.

- Map and identify datasets available or to be developed to enhance the integration of multimodal solutions in other supply chain processes (e.g. rail timetable information). Assess how new technologies (e.g. generative Artificial Intelligence, Internet of Things) could be leveraged and applied, including, but not limited to, the procurement and management of smart containers (e.g. for real-time monitoring of cargo conditions, ETA). Explore synchromodality strategies for logistics hubs and multimodal transport networks.

- Based on the business and technical requirements (e.g. transport management systems, data structures, data security) of both freight forwarders and shippers, develop interoperable solutions and tools to support freight forwarders and multimodal operators to address shippers' demands in terms of information provision and sharing, including as regards logistic hubs and first / last mile connections.

- Define use cases for multimodal transport for intra-European flows between 500 and 1,000 km (from first to last mile delivery), and collaborative business model(s) to shift freight transport demand to multimodal solutions.

- Validate, measure the performance and demonstrate the proposed solutions and concepts in 2 large pilots along segments of the main European freight transport corridors, ensuring geographical balance and covering various types of industrial sectors (e.g. fast-moving consumer goods industry). The pilots should be carried out with the involvement and cooperation of relevant transport operators, logistic companies and infrastructure managers.

- Assess and quantify the value generation (also in terms of sustainability and energy consumption reduction) of the proposed solutions for the shippers, multimodal operators and terminals.

- Analyse and propose recommendations for contingency plans to address disruptions in multimodal supply chains.

- Provide recommendations on possible revisions to the existing regulatory framework and propose initiatives to remove existing barriers to and facilitate, encourage and accelerate the adoption of multimodal transport solutions.

Proposals must plan for an active collaboration amongst the projects selected under this topic - for dissemination, evaluation and coordination. Proposals should ensure that appropriate provisions for activities and resources aimed at enforcing this collaboration are included in the work-plan. Information exchange with Europe's Rail Joint Undertaking Flagship Area 5 is advised to avoid duplicated research.

If the proposed solutions use position, navigation, and/or timing (PNT) services or data, the beneficiaries must make use of Galileo (other GNSS may additionally be used). Where

appropriate, Galileo services such as OSNMA (Open Service Navigation Message Authentication) and HAS (High Accuracy Service) should also be utilised.

HORIZON-CL5-2026-10-D6-07: Supporting sustainable and smart urban mobility in Europe (CIVITAS)

Call: Cluster 5 Call 10-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 4.00 million.
Type of Action	Coordination and Support Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Legal and financial set-up of the Grant Agreements	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) [285].

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

- Valorisation, cross-fertilisation and dissemination of innovative solutions for sustainable urban mobility, from EU and national projects through the CIVITAS initiative;

[285] 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

- Contribution to the accelerated deployment of innovative urban mobility solutions, increasing competitiveness of European urban mobility actors while achieving European mobility policy objectives.

- Cities are equipped with a relevant knowledge, necessary soft and technical skills to successfully deploy smart and sustainable mobility solutions, for passenger and freight.

- A vibrant community of urban innovative mobility stakeholders is maintained and strengthened.

Scope: Effective and efficient urban mobility systems are the backbone of competitive cities, without them the economy comes to a standstill. While cities are going through a rapid digital, green and social transformation, local and regional authorities play bigger roles and take on greater responsibilities in contributing to the prosperity, climate-neutrality and competitiveness of the European Union.

However, the deployment of innovative sustainable mobility solutions has been hampered by fragmentation of the support to cities at regional, national and EU level, lack of resources for experimentation with new approaches, insufficient knowledge on research results and innovative solutions, and difficulties for urban stakeholders to exchange knowledge, experiences and lessons learned, including providing feedback to policy makers and the research community.

The aim of this coordination and support action is to address the barriers to the deployment of innovative urban mobility projects' results through a comprehensive and collaborative approach, while further strengthening the European urban mobility innovation ecosystem.

Taking into account the previous CIVITAS coordination and support action[286], in collaboration with, and avoiding overlaps with, the Cities Mission Platform[287] and other relevant initiatives, the action is expected to address - in a clear and streamlined approach - all of the following aspects:

- Harvesting and spreading innovative urban mobility solutions, and speeding up the take-up of the related projects results by European cities by:

    - setting up capacity building and a replication programme, to facilitate twinning, mutual learning and peer-to-peer exchanges, which should include cooperation with industry, SMEs and start-ups, while ensuring a feedback to policy loop;

    - optimising the common, user-friendly CIVITAS project evaluation framework, with dedicated support for its implementation by the projects that are part of the CIVITAS initiative;

    - optimising and promoting the CIVITAS website as the main knowledge and exchange platform for the European urban mobility community by means of digital

286 CIVITAS MUSE | CIVITAS
287 NetZeroCities

tools and structured management approaches to disseminate information about the EU's urban mobility research and innovation developments and results.

- Developing and strengthening the urban mobility community in the EU and Associated Countries and actively engaging stakeholders across sectors and governance levels to facilitate common learning and exchange by:
  - facilitating and supporting the Educational and Youth network,
  - facilitating and optimising the support to national CIVITAS networks (CIVINETS),
  - supporting R&I projects' clustering, and the coordination of living lab activities,
  - organising the CIVITAS Forum, and supporting the organisation of the Urban Mobility Days,
  - under guidance of the Commission services, organising the CIVITAS Politicians Exchange Forum,
  - facilitating the exchange between cities, urban public transport authorities and the industry, SMEs and start-ups,
  - enlarging the CIVITAS network.

Since 2002 CIVITAS acts as an open platform that facilitates research, the uptake of innovative solutions, the validation of research results, the exchange of knowledge and best practices, and common learning in the area of urban mobility and transport. The project selected under this topic will help to ensure the long-term support for the R&I urban mobility projects offering governance, and an organisational and logistical framework that guarantees the wide dissemination and take up of urban mobility project results.

HORIZON-CL5-2027-06-D6-08: Enhancing Mobility for All: affordable, reliable, and accessible multimodal transport for inclusive rural and urban connectivity – Societal Readiness pilot

Call: Cluster 5 Call 06-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 21.00 million.
Type of Action	Innovation Actions

Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 7-8 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [288].

Expected Outcome: Proposals should address all of the following outcomes:

- Strategies, best practices and innovative solutions are made available to local authorities and actors to improve the availability, accessibility, and affordability of rural-urban transport and provide vulnerable rural and urban populations with better access to services and opportunities;
- Integrated multimodal solutions, which ensure seamless transitions between rural and urban transport modes improving first- and last-mile connectivity, are piloted and related implementation plans are developed for/by local authorities and transport operators;
- Responsiveness to a deeper understanding of the needs and concerns of diverse social group 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. Development of options for behavioural change towards healthier, safer and more sustainable mobility and lifestyles in vulnerable rural and urban populations.

Scope: EU policies, such as the Sustainable and Smart Mobility Strategy and the European Green Deal, emphasise the need for inclusive, efficient, and sustainable transport systems that leave no one behind. Transport poverty refers to individuals' and households' inability or difficulty to meet the costs of private or public transport, or their lack of or limited access to transport needed for their access to essential socioeconomic services and activities. Considering

[288] 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

the national and spatial context, transport poverty affects both rural and underserved urban areas. Addressing this challenge requires innovative multimodal transport solutions which integrate various modes efficiently, leveraging digitalisation, shared mobility, and demand-responsive transport to enhance affordability, reliability, and accessibility, thereby ensuring Mobility as a Right.

Proposals should address all the following aspects:

- Building on the outcome of previous calls and existing knowledge (e.g. SMARTA-NET[289], the study on Novel policy ideas for a shift to low-carbon mobility[290], the study on Transport poverty: definitions, indicators, determinants, and mitigation strategies[291] and other relevant EU-funded projects[292]), and drawing on the feedback experience of existing innovative mobility solutions (e.g. SMARTA-NET Catalogue of rural shared mobility solutions[293]), investigate strategies to enhance availability and accessibility of sustainable and inclusive transport services in sparsely populated regions with limited transport options.

- Analyse the demand for mobility services in regions and communities affected by transport poverty and investigate which drivers could facilitate vulnerable transport users (including consideration of gender disparities in mobility and access to transport) to use public transport or other shared mobility options (including e.g. underutilised regional and secondary rail lines or feeder services to main rail corridors).

- Develop new sustainable and inclusive integrated multimodal solutions that ensure seamless transitions between rural and urban transport modes, improving first- and last-mile connectivity. Solutions should focus on vulnerable and low-income households (including consideration of gender disparities in mobility and access to transport), and should combine, in an optimal (economic, social, environmental, and operational) way, the various modal transport offers to go beyond forced car ownership. Developing new digital platforms is out of the scope of this topic.

- Each action must include pilot demonstrations in at least 4 pilot sites. The pilot demonstrations should cover 4 different areas across the EU and Associated Countries ensuring geographical balance and diversity of issues addressed (e.g. presence or not of transport services such as regional trains, frequency of services, population density). Each proposed issue should be addressed in at least two pilots. The pilots should be community-driven, carried out under the lead or with the involvement of rural local/regional public authorities/administrations and the local transport authorities, and these entities must be included in the consortium as beneficiaries.

289 https://www.smarta-net.eu/
290 https://op.europa.eu/en/publication-detail/-/publication/ae58bebf-b2b9-11ef-acb1-01aa75ed71a1
291 https://op.europa.eu/en/publication-detail/-/publication/0b300f5f-b125-11ef-acb1-01aa75ed71a1/language-en
292 Various shared mobility solutions have been demonstrated in multiple European projects, including , SMARTA2, LAST MILE, MAMBA, INCLUSION, MARA, MELINDA, Hi-Reach, UPPER and SPINE.
293 Solutions – SMARTA-NET

- Elaborate and propose plans for a possible implementation of the developed and tested solutions by local authorities and transport authorities/operators.

- Through the active engagement of public transport operators, local authorities, rural communities, and civil society organisations, through the European Rural Mobility Network (ERMN)[294], elaborate a roadmap to implement and scaling up the tested solutions, while ensuring widespread adoption across diverse regional contexts.

Proposals must plan for an active collaboration amongst the projects selected under this topic - for dissemination, evaluation and coordination - facilitated by and within the CIVITAS initiative[295] through the signature of a Memorandum of Understanding. Proposals should ensure that appropriate provisions for activities and resources aimed at enforcing this collaboration are included in the work-plan.

If the proposed solutions use position, navigation, and/or timing (PNT) services or data, the beneficiaries must make use of Galileo (other GNSS may additionally be used). Where appropriate, Galileo services such as OSNMA (Open Service Navigation Message Authentication) and HAS (High Accuracy Service) should also be utilised.

This topic is a Societal-Readiness pilot:

- Proposals should follow the instructions applying to the Societal Readiness pilot, as described in the introduction of the Horizon Europe Main Work Programme 2026-2027 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 designing inclusive transport systems that consider accessibility, equity, and digital literacy. Proposals should consider citizens engagement and dialogue, for seeking wider input and support.

Safety and resilience

Proposals are invited against the following topic(s):

HORIZON-CL5-2026-10-D6-09: Road Safety and resilience of rural areas

Call: Cluster 5 Call 10-2026 (WP2026-2027)
Specific conditions

294 ERMN – SMARTA-NET
295 CIVITAS

Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 12.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B.
Legal and financial set-up of the Grant Agreements	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) [296].

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

- Implementation of the NWRSA methodology for secondary rural roads;
- Innovative and effective enforcement strategies, incentive mechanisms and measures raising risk awareness for fostering safer behaviour;
- Prevention strategies for reducing road fatalities and serious road traffic injuries on rural roads along with the respective implementation guidelines and policy measures tailored to the responsible stakeholders (regional authorities, police, healthcare professionals, national governments, etc.);

[296] 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

- GIS-based application to assist local and regional authorities in identifying and mapping the impact of extreme weather phenomena and other natural disasters (such as floods, fires, storms, heavy snowfall etc.) on the safety and resilience of the road network in their jurisdiction.

Scope: With more than 50% of all EU road fatalities occurring in rural areas along with evidence suggesting that crashes and crash-related fatalities in rural roads vary from those in urban roads or motorways, it is imperative to understand and mitigate the safety risks in rural roads in view of the EU's ambition to move towards Vision Zero by 2050. Local and regional authorities have an important role to play to reduce road fatalities and serious injuries.

In the EU, the Road Infrastructure Safety Management (RISM) Directive introduced the concept of network-wide road safety assessment (NWRSA) and the concept of proactive road safety assessment through the understanding of the in-built safety of roads. Considering safety at the network-level allows for an overview of the road safety performance instead of focusing on isolated parts of it, while the in-built safety assessment aims to identify parts of the road that have been omitted by crash-based analyses (such crash clusters or hotspot analysis) as they do not concentrate the majority of crashes, yet are crash-prone and/or uncomfortable to navigate. According to the provisions of the RISM Directive, a methodology has been developed to assess the network-wide safety of motorways and primary rural roads based on their combined crash-based and in-built safety assessments. While this is a first step in understanding road safety conditions on rural roads, secondary and lower-class roads are not covered and, at the same time, there is not adequate information on road user behaviour.

In an ageing society, cognitive and physical impairments pose an increasing threat to safe mobility. In rural areas, people with any kind of impairment often lack alternatives to driving a car for their mobility needs. Addressing these issues will not only enhance road safety but also improve the quality of life and prevent the social exclusion of these people.

In addition to road safety issues, local and regional authorities manage risks associated with extreme weather phenomena and other natural disasters like floods, fires, storms or heavy snowfall. As these may affect safety and operations, relevant authorities need to adopt a more holistic resilience monitoring and response.

Research should support addressing these challenges by undertaking all the following actions in at least three regions covering both primary and secondary rural roads of adequate length to allow for region-level comparisons:

- Demonstrate the practical applicability of the NWRSA methodology and expand its use to all rural roads for an easy, low-cost, flexible and transparent, yet sufficiently accurate assessment of road infrastructure safety. Identify information gaps and propose methods to leverage available data to supplement the understanding of crash causation and outcomes.

- Develop prevention strategies and measures to reduce fatalities and serious injuries in rural areas with a focus on high-risk locations and situations and on improving road user

behaviour. This includes the development of reliable and easy-to-use methods to provide quantified indications of the actual crash risk associated with and the prevalence of risky behaviours. Based on this, enforcement measures with evidence-based effectiveness in addressing the problems and motivations underlying risky behaviour should be proposed, combining traditional methods with innovative enforcement approaches and new technologies, also taking into account the issue of multi-offenders[297]. These enforcement measures, complemented by suitable awareness raising and nudging measures as well as novel incentive mechanisms to promote safe driving, will form building blocks to design integrated strategies fostering safer behaviour according to the local needs and specificities of rural areas. A gender sensitive approach, which intersects with other social factors, could be considered. Crash prevention strategies should also include countermeasures to reduce the effects of health-related risk factors and to guarantee at the same time the mobility of older people and persons with health impairments in rural areas.

- Develop tools to make knowledge about climate-related risks easily accessible to local authorities and to enable them to take appropriate actions in order to maintain road safety and the resilience of the rural road network and of the infrastructure for vulnerable road users even in extreme conditions. [298]

Projects should select those regions ensuring diversity in terms of road network design, geography and climate conditions, and road safety culture. At least two of those regions should be in countries with higher percentage of fatalities on rural roads than the EU average. The involvement of road authorities is strongly recommended.

HORIZON-CL5-2026-10-D6-10: Enhanced resilience in multimodal passenger transport through digital technologies and generative and discriminative AI

Call: Cluster 5 Call 10-2026 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 10.00 million.
Type of Action	Innovation Actions

[297] A small group of repeat offenders account for a large share of crashes (e.g. 5% in population vs. 27% in crashes according to SWOV 2017 Progressief boetestelsel) and intoxication by drugs (Recent studies show that the share of crash-involved drivers intoxicated by drugs equals or even surpasses those intoxicated by alcohol [Gjerde & Forst 2023].

[298] Such tools may be based on results from projects under HORIZON-CL5-2024-D6-01-11 (effects of disruptive changes in transport) as well as on other thorough analyses of how such situations were managed in the past and what can be improved.

Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B.
Legal and financial set-up of the Grant Agreements	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) [299].

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

- Development of systems that utilize real-time data analytics to dynamically respond to disruptions, allowing transport and infrastructure operators to adjust operations swiftly and efficiently;
- Development of predictive maintenance strategies applying innovative Generative AI solutions and utilizing other digital technologies to anticipate and prevent infrastructure and equipment failures;
- Development of guidelines and tools to support passenger transport operators and authorities to ensure minimal disruption in unexpected and critical situations and organise real life emergency simulations;
- Deployment of training programme for transport and infrastructure operators on how to handle transport disruption, including tools and catalogue with contingency planning for specific transport disruptions;
- Reduction of average passenger delay at corridor level (at least 20%) during planned disruptions, compared to the baseline and of (at least 40%) time needed from the generation to the dissemination of a response plan to different stakeholders (e.g. transport

[299] 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

operators, passengers, citizens) during unplanned and critical events, compared to the baseline.

Scope: Passenger transport systems are a critical component of urban, sub-urban, and long-distance travel, facilitating connectivity, reducing traffic congestion, and supporting environmental sustainability. However, these systems face challenges such as operational disruptions, safety and security risks, and evolving passenger demands.

In the context of passenger transport, resilience refers to the ability of a transport system to absorb disturbances, maintain its basic structure and function, and recover to a required level of service within acceptable time and cost after being affected by disruption. This involves implementing measures that ensure continuous operation, quick recovery from unexpected events, and adaptability to changing circumstances. Enhanced resilience is essential for maintaining public trust and ensuring smooth functioning of transport systems and it is a cornerstone of the EU Sustainable and Smart Mobility Strategy.

Proposed actions are expected to address all of the following aspects:

- Development and implementation of measures to enhance the resilience of urban, sub-urban and long-distance transport systems.
- Leveraging digital technologies (e.g. big data, digital twins) and in particular generative and discriminative AI for anticipating and predicting the evolution of disruptions and their impacts, with real-time planning and information systems for minimizing impact and enabling faster recovery.
- Use of innovative technologies for data acquisition and integrate data from various sources to inform decision-making and optimise strategies, and generate scenario libraries for different disruptive events and monitor the implementation of the response plans
- Involve authorities and operators in the design process to create holistic solutions that are user-friendly and aligned with their needs.
- Conducting safety and security assessments in data interpretation, ensuring decisions are based on objective factors while avoiding biases.
- Test and validate the aspects above in real-life use cases in multimodal transport corridor within urban, sub-urban and long-distance passenger transport with minimum three transport modes per use cases (e.g. buses, metros, trams, trains, coaches, trolleybuses, ferries, share mobility) in at least three pilot sites situated in different Member States and reflecting a diversity of operational, geographic, and technological contexts.

Proposals are encouraged to building on results from previous calls on infrastructure and transport resilience (e.g. HORIZON-CL5-2024-D6-01-11, MG-7-1-2017, HORIZON-CL5-2021-D6-01-09), multimodal traffic management (e.g. HORIZON-CL5-2022-D6-02-05, MG-2-11-2020), shared mobility and public transport (e.g. HORIZON-CL5-2022-D6-02-04, HORIZON-MISS-2021-CIT-02-02). Proposals should also comply with existing EU

framework and strategies and building upon the concepts and solutions developed in other Union initiatives aimed to facilitate data sharing in transport, such as the European mobility data space (EMDS). 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).

HORIZON-CL5-2027-06-D6-11: Enhancing Resilience and Accuracy in Positioning, Navigation, and Timing (PNT) Systems and e-conspicuity solutions

Call: Cluster 5 Call 06-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 5.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B. Activities may start at any TRL.
Legal and financial set-up of the Grant Agreements	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) [300].

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

[300] 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

- Development of solutions integrating 5G networks, supported by advanced signal processing techniques (e.g. AI-Enhanced Signal Processing) to improve the accuracy of PNT systems, as GNSS backup solutions to enhance resilience in contested environments, including filtering noise and interference from signals to enhance the precision of location data.

- Integration with Other Technologies: Development of solutions leveraging Internet of Things (sensors, communication signals, AI-enhanced processing), and other sensing techniques to provide redundant and resilient navigation solutions and to enhance capabilities and applications, especially at low altitude airspace.

- E-conspicuity: Definition of mobile communication performance requirements for e-conspicuity, assessment of network performance and determination of minimum availability requirements for mobile telephony for collision to support collision avoidance for a drone and manned aircraft.

- Analysis of policy and regulatory aspects to better understand the legal and regulatory issues surrounding the deployment and use of PNT systems, including concerns related to privacy, spectrum management, international cooperation, and harmonisation of regulatory frameworks and shared technologies.

Scope: Today's Position, Navigation and Timing (PNT) services are primarily provided through Global Navigation Satellite Systems (GNSS) that tend to have weak signals and are vulnerable to jamming and spoofing.

This topic addresses alternative PNT methods that are essential to provide fallback options in case of GNSS signal loss or degradation. Great benefit is expected through integration of PNT technology with rapidly emerging technologies, such as 5G/6G and Internet of Things (IoT). The aim is to investigate innovative solutions for PNT – including the impact on the regulatory framework, integrating advanced 5G technologies and IoT to act as complementary, redundant, secure and resilient navigation solutions for aviation, including UAS, in challenging environments.

The topic also addresses e-conspicuity, aiming to enhance pilot awareness notably at lower altitudes in U-space airspace in order to reduces collision risk in general aviation, where most small aircraft rely on see-and-avoid. Mobile telephony, with minimum network performance requirements, can provide a safe, affordable communication solution for U-space entry and flight safety.

Cross-cutting issues

Proposals are invited against the following topic(s):

HORIZON-CL5-2027-06-D6-12: Support for dissemination events in the field of Transport Research

Call: Cluster 5 Call 06-2027 (WP2026-2027)	
Specific conditions	
Expected EU contribution per project	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.
Indicative budget	The total indicative budget for the topic is EUR 1.50 million.
Type of Action	Coordination and Support Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Legal and financial set-up of the Grant Agreements	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) [301].

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

1. Successful Transport Research Arena conference (TRA) in 2030;
2. Conference papers published in proceedings and in a recognised scientific journal;
3. Higher visibility, political and strategic relevance of the transport sector and of the EU policy in the field;

[301] 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

4. Enhanced dissemination, communication and valorisation of transport R&I objectives, perspectives, strategies and results;

5. 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 and Associated Countries;

6. 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;

7. Successful organisation of a series of awards in transport research and innovation to recognise excellence of young and senior researchers, covering all transport modes and cross-cutting issues;

8. 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 2030 gathering transport stakeholders for discussing political, industrial and research issues on a European and global level.

In line with previous TRA biennial 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 and competitiveness needs and expectations. Specific attention should be put on a broad and balanced participation in the conference i.e., students, young researchers, women, many country representatives, etc.

The action will be implemented in close collaboration with the Management and Programme Committees of the TRA, which includes 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 2028) in order to maintain continuity of the event.

Proposals should address all the following aspects:

- Demonstrate the financial and organisational capacity of the national authorities interested to host the event and provide an economic plan covering the potential additional funding needs;

- Describe the involvement of the Member State holding the Presidency of the European Union in year 2030 to better ensure a high political and strategic relevance;

- 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, support the organisation of the conference's logistics and include a Professional Conference Organiser (PCO) in the consortium;

- Provide operational support to the TRA conference, 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 high-quality awards series for transport research and innovation awards (TRA VISIONS) covering all transport modes and cross-cutting issues including technological, socio-economic, and behavioural aspects, in line with the EU policy objectives for digitalisation and climate-neutral and environmentally friendly mobility:

    - An award stream 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;

    - An award stream for senior researchers in the field of innovative transport concepts based on results from EU-funded projects only. This will include in addition, a special honorary award as a recognition of outstanding and well-recognised contribution to transport-related research and innovation of a senior researcher who is about to complete or has completed his/her career.

- Involve the awarded researchers in the conference programme and promote links between the researchers and possible career development opportunities in the field (e.g. traineeships, jobs, courses, training);

- Foresee a very good media coverage and dissemination activities before, during and after the event for both the TRA conference and for the TRA VISIONS. A mechanism should be put in place to clearly track outreach efforts and evaluate their impact.

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Other Actions[302]

Public procurements

1. Technical support for low carbon and renewables policy development and implementation

Technical support for the development and implementation of policies related to low carbon and renewable energy, e.g. science-based studies on sustainability, certification, climate impacts, industry competitiveness, consumer information, and facilitation of standardisation.

Form of Funding: Procurement

Type of Action: Public procurement

Indicative timetable: 1st quarter 2026 and 1st quarter 2027

Indicative budget: EUR 1.00 million from the 2026 budget and EUR 1.00 million from the 2027 budget

2. Comprehensive study on the need to update and enhance emergency and restoration activities and actors in view of the evolution of the power system

Distributed energy resources, digitalisation, electrification and higher threats to the power system call for revisiting whether there is a need to update the emergency and restoration framework.

Form of Funding: Procurement

Type of Action: Public procurement

Indicative timetable: 1st quarter 2026

Indicative budget: EUR 0.50 million from the 2026 budget

3. Medium temperature industry: needs, barriers, and opportunities for direct use-renewable heating technologies

The action aims to map European medium temperature industry, per Member State, including heat demand, temperature requirements, type of industry, and technology currently used to provide the heat. The action is expected to identify both available and emerging direct use-renewable heating technologies, including, when applicable, thermal energy storage systems, their potential to fulfil the heat demand for these industries, and the barriers for their deployment (including technical, regulatory, and financial issues). The action is also expected to produce a catalogue of best practices, highlighting examples per industry type and per temperature range

[302] The budget amounts are subject to the availability of the appropriations provided for in the general budget of the Union for years 2026 and 2027.

of direct-use renewable heating demonstrators. Pathways for secondary uses of waste heats from these industries should also be covered in an integrated approach, where relevant.

Form of Funding: Procurement

Type of Action: Public procurement

Indicative timetable: 2nd quarter 2026

Indicative budget: EUR 0.50 million from the 2026 budget

4. Study on electricity grids technologies supply chains

Fact finding study focusing on key elements of the electricity grids, assessing the state of play and future development of supply chains and identifying strengths and weaknesses. The study should focus on the EU and the supply chain analysis should also include a global, international dimension.

Form of Funding: Procurement

Type of Action: Public procurement

Indicative timetable: 1st quarter 2026

Indicative budget: EUR 0.50 million from the 2026 budget

5. Local energy markets

Exploratory study on local energy markets to see how local energy markets can be integrated with the wholesale market in a standardised manner and based on locational signals. The study will identify technical and regulatory conditions conducive towards achieving this objective, as well as assess economic and system impacts for consumers and system operators.

Form of Funding: Procurement

Type of Action: Public procurement

Indicative timetable: 1st quarter 2027

Indicative budget: EUR 0.40 million from the 2027 budget

6. Boosting competitive advantage of clean energy technologies with European project results

The purpose of this procurement is to analyse project results of Horizon Europe Cluster 5 work programme destination 3 projects regarding their contribution to competitive advantage of European clean energy technologies as well as to intended expected project outcomes and to define measures for boosting the realisation of this advantage.

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Firstly, the task will consist in defining relevant competitiveness indicators and analysing the Horizon Europe project portfolio in respect of competitive advantage as well as to expected topic outcomes based on available project data sources as well as consultation of the projects on competitiveness indicators.

Secondly, for boosting competitive advantage, the task will consist in defining pathways and concrete measures for follow-up innovation and uptake of project results, including supportive measures in form of clustering events and communication.

Form of Funding: Procurement

Type of Action: Public procurement

Indicative timetable: 2nd quarter 2026

Indicative budget: EUR 0.60 million from the 2026 budget

7. Financial and technical results development assistance for innovative renewable energy results from H2020 and HE projects to start-ups and SMEs

The procurement will provide supports in terms of training, project development, business model development, and access to finance to start-ups, SMEs and consortium having results obtained through Horizon 2020 and Horizon Europe projects, including international projects.

The goal is to improve the maturity of the results obtained in European funded projects through high-quality technical and financial advisory support to access funding provided by the European Investment Bank (EIB), the Innovation Fund, and other private and public funding programme. For international projects, ensure alignment with Global Gateway Strategy priorities.

Form of Funding: Procurement

Type of Action: Public procurement

Indicative timetable: 2nd quarter 2026

Indicative budget: EUR 2.50 million from the 2026 budget

8. Creating synergies between Missions Clean Hydrogen, Urban Transitions and Zero-Emission Shipping of Mission Innovation on social impact of hydrogen economy

The procurement aims to strengthen collaboration between Mission Innovation's three missions (Clean Hydrogen, Urban Transitions, Zero Emission Shipping) and innovation communities that operate under Mission Innovation.

Activities will take place in a context where the number and geographical spread of hydrogen valleys are increasing, with strong impact on neighbouring cities and urban environments nearby ports. At the same time, several techno-economic barriers such as lack of advanced infrastructure, high production and demand costs, and uncertainties in the regulatory

environment and markets are slowing down the speed of the hydrogen transition globally. Identifying and assessing such barriers and related social aspects in areas that cut across the three Mission Innovation missions are key for a successful hydrogen transition, also taking into account the transport of hydrogen to the Global North. Close cooperation with Hydrogen TCP is welcome on data analysis.

The action focuses on three types of activities:

- Identification of areas of collaboration to reinforce site-based and/or intervention-minded synergies between the three Mission Innovation missions, based on their workplans and strategic orientations.
- Delivery of well-documented and in-depth case studies for at least three projects that operate at the intersection of the priorities and geographies of the three missions. The case studies should address jointly the topics of low-emissions hydrogen, zero-emission shipping and net-zero transitions of cities. As such, they should provide a thorough technical, economic and social assessment of integrated hydrogen projects located in port-cities. They should also analyse the multifaceted impact of Hydrogen Valleys on cities and ports.
- Development of training materials and strategies for disseminating and applying the findings from these activities. This should include the organisation of at least three joint events highlighting the work of the three Missions and promoting the dissemination of knowledge and information to interested organisations and individuals.

Form of Funding: Procurement

Type of Action: Public procurement

Indicative timetable: 2nd quarter 2026

Indicative budget: EUR 0.30 million from the 2026 budget

9. Advancing Climate Finance for Global Transition Pathways Towards Carbon Neutrality and Climate Resilient Development

Achieving the transition towards carbon-neutral and climate-resilient development necessitates a comprehensive understanding of the financial needs, targeted investment areas, and the deployment of effective financial instruments on a global scale. Moreover, reforming the international financial architecture is crucial to facilitate and support this transition.

The action should explore these critical dimensions of climate finance, including the identification of tools to monitor climate financial flows (public and private, international and domestic) as a foundation for evidence-based decision-making. The action should cover the following elements at global level with differentiation by geographic area with a focus on SIDS and LDCs: 1) Identification of Financial Needs for Climate Transition 2) Targeted Areas for

Investment 3) Financial Instruments and Mechanisms 4) Reforming the International Financial Architecture 5) Monitoring Climate Financial Flows 6) Mobilizing Private Sector Investment.

Form of Funding: Procurement

Type of Action: Public procurement

Indicative timetable: 1st quarter 2026

Indicative budget: EUR 1.50 million from the 2026 budget

10. Road safety analysis supporting road safety management

This action aims to supplement existing data sources by improving the quality of and facilitating the access to a broad range of road safety data necessary for setting targets, defining countermeasures, and monitoring progress within the Safe System Approach.

In particular the action aims to improve the quality of and facilitate the access to a wide range of road safety data necessary for setting targets, defining countermeasures, and monitoring progress in line with the Safe System Approach. Upgrading road safety data availability and quality exploiting new technological developments in big data and Artificial Intelligence (AI) is a key priority, with special emphasis on data concerning long-term consequences of serious injuries, vulnerable road users' risk exposure and safety performance indicators, taking into account new mobility modalities - Personal Mobility Services (PMD), Mobility as a Service (MaaS), etc. Following the Safe System Approach and its principle to move turn from re-active to pro-active road safety management, road safety analysis should increasingly take into account surrogate measurements such as near misses and safety-critical situations in addition to actual crashes, broadening significantly the data available for analysis and for the identification of prevention strategies. This can be facilitated by the automation of data analysis and data collection from daily traffic and by the automated analysis of such data, obtained from various sources

According to these needs, all the following aspects will need to be addressed in alignment with relevant stakeholders:

- Exploitation of new data on fatalities and serious injuries through collection, processing and analytical techniques using any types of devices, technologies and sensors with the support of Artificial Intelligence at all stages for spotting risk factors and identifying customized remedial measures. Emphasis should be given to data concerning vulnerable road users' risk exposure and safety performance indicators and on new mobility modalities (PMD, MaaS, etc.).

- Examine and analyse existing national systems for in-depth crash investigations in at least 5 countries (and incorporating in-vehicle data) comprising vehicle, infrastructure and behaviour risk factors, drawing conclusions on causality between the risk factors and crashes and develop the related open access databases for crash and injury causation, coordinating with and building on all existing state-of-the-art initiatives in Europe. In this

context, links should be established to the results of projects under HORIZON-CL5-2021-D6-01-02 and HORIZON-CL5-2023-D6-01-02. In coordination with actions under HORIZON-CL5-2025-01-D6-14, prepare the next step from the demonstration of the feasibility of AI and big data supported risk predictions towards an agreed future framework for the prediction of road crashes and their severity coupled with related customised remedial measures. The potential exploitation of new data sources should be analysed, such as floating vehicle data, advanced sensing technologies, road user behaviour telematics and real-time monitoring systems and appropriate protocols should be developed.

Form of Funding: Procurement

Type of Action: Public procurement

Indicative timetable: 3rd quarter 2026

Indicative budget: EUR 1.00 million from the 2026 budget

11. 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 2026 and as of 1st quarter 2027

Indicative budget: EUR 0.70 million from the 2026 budget and EUR 0.50 million from the 2027 budget

12. 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 2026 and as of 1st quarter 2027

Indicative budget: EUR 1.00 million from the 2026 budget and EUR 1.00 million from the 2027 budget

13. Support to the SET Plan conference

Support for the preparation and organisation of the annual SET Plan conferences in 2027 and 2028 under the respective Presidencies of the Council of the European Union.

Form of Funding: Procurement

Type of Action: Public procurement

Indicative timetable: 4th quarter 2026 and 4th quarter 2027

Indicative budget: EUR 0.40 million from the 2026 budget and EUR 0.40 million from the 2027 budget

Indirectly managed actions

1. Voluntary contribution to the EUI/FSR for research, analysis in support of the NZIA/CID/GD implementation

The unique expertise and network of experts in energy systems, markets and policy of the European University Institute, and in particular the Florence School of Regulation, will be used to provide input on key contemporary issues to support the European Commission in evaluating, designing and implementing energy policy to bring forward the energy transition towards a renewable-based, energy efficient, interconnected and digitalised energy system that supports a globally competitive economy and ensures security of supply.

Depending on the urgency and depth of analysis, the input/deliverables can be in the form of a policy brief, an extensive study or report as well as ad hoc presentations and/or workshops or events to discuss energy policy issues. The input/deliverables can also be accompanied with tailor-made training in Brussels or in Florence for European Commission staff.

Legal entities:

European University Institute, Via dei Roccettini 9, San Domenico di Fiesole, 50014, Italy

Form of Funding: Indirectly managed actions

Type of Action: Indirectly managed action

Indicative timetable: 1st quarter 2026

Indicative budget: EUR 0.60 million from the 2026 budget

2. 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[303], 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 Partnership between the European Commission, the European Investment Bank and the Breakthrough Energy Catalyst foresees a contribution of EUR 200 million from Horizon Europe over the period 2022 -2026 (transferred in instalments of EUR 50 million in each 2022-2023 and 2025-2026).

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[304] 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

303 https://www.eib.org/en/products/mandates-partnerships/innovfin/products/energy-demo-projects.htm
304 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0301

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 electrolysers, 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[305], 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_2 emissions in the EU in 2018, it accounted for 15.7% of CO_2 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 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[306] 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*[307] 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

[305] https://ec.europa.eu/growth/industry/policy/european-clean-hydrogen-alliance_en

[306] 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))

[307] Renewable Fuels of Non Biological Origin (RFNBOs) as defined under RED II.

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_2*. 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_2 point capture and 200 Mt of CO_2 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 the captured CO2 (i.e. underground storage or use), renewable energy source used for the capture process, and vicinity to CO2 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_2. 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 CO2 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 CO2.

Functioning of the blending operation agreement

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: 1st quarter 2026

Indicative budget: EUR 50.00 million from the 2026 budget

3. Support to research activities of the European Union Aviation Safety Agency (EASA)

Ad hoc research activities to be deployed under responsibility of the European Union Aviation Safety Agency (EASA), in areas relating to the field of competence of the Agency, contributing to the responsibilities of the Agency as the European regulator for aviation safety and environmental measures. Research activity by the Agency pursuant to Article 86 Regulation (EU) 2018/1139 [308]

Activities are selected in accordance with policy objectives for safe and sustainable aviation, the integration of alternative air mobility, the introduction of new sustainable technologies and digitalisation in the aviation eco-system. In accordance with its statutory tasks, EASA has assisted the Commission and Member States in identifying key research themes in its field of competence.

Project results are expected to contribute to the following expected outcomes [subject to priority assessment in function of available budget]:

- Aviation Safety – Research to better understand, address and prevent identified safety hazards regarding aircraft technology, medical/health aspects for aviation profession (sleep apnoea, high altitude operations), safety of air operations (extended maximum crew operations [EMCO], data reports for evidence-based training) for the purpose of future rulemaking.
- Innovative Air Mobility– Study on technologies and subsystems needed to ensure an EU supply chain for UAS, with a focus on areas where Europe is not strategically independent to safeguard an EU open strategic autonomy.
- Automation and digitalisation – Research to enable changes to the regulatory framework to better allocate tasks and responsibilities between different actors considering the impact of technologies on the aviation profession (workload, fatigue) and mitigate identified safety hazards; ; data intelligence solutions for safety risk mitigation (Data4Safety).
- Environment – SAF market uptake: accelerate production and use, promote innovation, ensure quality, sustainability and safety of aviation fuels, and facilitate international collaboration.
- Security – Interaction between artificial intelligence and cyber security; risk assessment methodology for air operators to address conflict zones risks.

Legal entities:

European Union Aviation Safety Agency (EASA), Konrad-Adenauer-Ufer 3, D-50668 Cologne, Germany

[308] Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, OJ L 212, 22.8.2018, p. 1

Form of Funding: Indirectly managed actions

Type of Action: Indirectly managed action

Indicative timetable: 1st quarter 2026

Indicative budget: EUR 8.00 million from the 2026 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 TCPs in which the Commission represents the European Union:

- 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;
- Cities
- 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

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Indicative timetable: 1st quarter 2026 and 1st quarter 2027

Indicative budget: EUR 0.50 million from the 2026 budget and EUR 0.50 million from the 2027 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 2026 and 1st quarter 2027

Indicative budget: EUR 0.60 million from the 2026 budget and EUR 0.60 million from the 2027 budget

3. Voluntary contribution to the CEM secretariat and for participation in workstreams of the Clean Energy Ministerial

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 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: 1st quarter 2026 and 1st quarter 2027

Indicative budget: EUR 0.12 million from the 2026 budget and EUR 0.12 million from the 2027 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 2026 and 1st quarter 2027

Indicative budget: EUR 0.08 million from the 2026 budget and EUR 0.08 million from the 2027 budget

5. Voluntary contribution 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 and gives its delegates the right to speak and to introduce proposals like any IPCC Member, but not to vote. The IPCC puts no financial obligations on members and observers but is funded solely through voluntary contributions and grants. The EU has been a significant contributor to the IPCC over the years, most recently, though a grant under the call H2020-IBA-SC5-IPCC-2019 aimed to facilitate the preparation of the IPCC's its Sixth Assessment Report (AR6). Given IPCC's importance in promoting science-based approaches in climate action, it would be appropriate to continue supporting the IPCC Panel in the form of a subscription as a token of EU's commitment to evidence-based policies.

Type of Action: Subscription action

Indicative timetable: 1st quarter 2026

Indicative budget: EUR 1.00 million from the 2026 budget and EUR 1.00 million from the 2027 budget

6. Voluntary contribution to the Mission Innovation Secretariat, hosted by the International Energy Agency

Mission Innovation is a global platform bringing together 23 countries and the European Commission (on behalf of the EU), launched at COP21 in 2015, with the aim to accelerate efforts in clean energy globally. Its goal is to both stimulate political action and attract investments on research, demonstration, and development to make clean energy technologies more attractive, affordable, and accessible to all.

Mission Innovation (MI) is entirely voluntary, a free commitment of countries, international organizations and industry, that are all welcome to collaborate and provide support to its workstreams according to their own strategic priorities. MI members represent over 95% of global government investments in clean energy research and innovation.

In 2021, MI has reached the end of its first phase of five years, in which its members have successfully stimulated global efforts, increasing annual investments by more than USD 5.8 billion and developing over 70 new international collaborations (worth USD 1.4 billion) in clean energy through joint calls, demonstration projects, and student and researcher exchanges. If 1000 innovations delivered by MI members were fully deployed, they could avoid emission of over 12 Gigatons of CO2 per year until 2030.

MI 2.0, launched in June 2021, concentrates on seven impact-oriented, public-private missions, with ambitious goals that accelerate the pathway towards the Paris Agreement goals and net zero. Namely they focus on: clean hydrogen, urban transitions, zero-emission shipping, net-zero industries, green power, integrated biorefineries and carbon dioxide removal.

The Commission currently plays a key leadership role in Mission Innovation, by (co-) leading two missions, through its contribution to the governance of Mission Innovation and by delivering the Chair of the MI Steering Committee.

As of September 2025, the Secretariat of Mission Innovation is hosted by the International Energy Agency. While continuing to be a member driven initiative, the allocation of the Secretariat to the IEA will allow the multilateral platform to receive financial contributions from its Member States. At the MI Steering Committee meeting on 30 October 2024, Members have expressed their support to the new Hosting arrangement and provided indication of financial commitment to the Mission Innovation Secretariat.

Type of Action: Subscription action

Indicative timetable: 1st quarter 2026 and 1st quarter 2027

Indicative budget: EUR 0.40 million from the 2026 budget and EUR 0.40 million from the 2027 budget

Scientific and technical services by the Joint Research Centre

1. 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

Type of Action: Provision of technical/scientific services by the Joint Research Centre

Indicative timetable: 1st quarter 2026 and 1st quarter 2027

Indicative budget: EUR 1.00 million from the 2026 budget and EUR 1.00 million from the 2027 budget

2. Analysis and input to support the work on energy security

Inform energy security and preparedness policies during the energy transition, increasing prevention, preparedness and mitigation actions against electricity disruptions of any origin.

Type of Action: Provision of technical/scientific services by the Joint Research Centre

Indicative timetable: 1st quarter 2026 and 1st quarter 2027

Indicative budget: EUR 0.12 million from the 2026 budget and EUR 0.38 million from the 2027 budget

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3. Analysis and input to support the work on critical raw materials

Inform our understanding of the EU net needs for critical raw materials in clean energy technologies as well as the exposure to risks, thus supporting potential policy actions and increasing preparedness against disruption.

Type of Action: Provision of technical/scientific services by the Joint Research Centre

Indicative timetable: 1st quarter 2026

Indicative budget: EUR 0.40 million from the 2026 budget

4. Bidding zone review and locational marginal pricing

Following the EMD reform it will be necessary to take into account the future energy landscape and generation mix. The aim of the report(s) is to identify whether a more granular market and/or reorganisation of the bidding zones could help the objectives of secure, sustainable, competitive, affordable energy for EU consumers.

Type of Action: Provision of technical/scientific services by the Joint Research Centre

Indicative timetable: 1st quarter 2026

Indicative budget: EUR 0.20 million from the 2026 budget

5. Energy Markets and Energy System Modelling Support 2026

This support includes the upcoming baseline and policy scenarios for the current Commission's mandate.

Type of Action: Provision of technical/scientific services by the Joint Research Centre

Indicative timetable: 4th quarter 2026

Indicative budget: EUR 1.50 million from the 2027 budget

6. Strengthened collaboration between the Joint Research Centre and the UNFCCC Technology Executive Committee (TEC)

Contribute to the implementation of the Rolling workplan of the UNFCCC Technology Executive Committee for 2023 – 2027. This will be done through direct support to the workplan's different workstreams, including in the form of developing policy briefs and deliverables for the TEC, participation as observers in TEC meetings, participation in TEC working groups, delivering workshops presenting deliverables at regional climate fora, and presentation of deliverables at UNFCCC meetings including June Climate meetings and COPs.

Type of Action: Provision of technical/scientific services by the Joint Research Centre

Indicative timetable: 1st quarter 2026

Indicative budget: EUR 1.00 million from the 2026 budget

7. Joint Research Centre support to the Global Covenant of Mayors for Climate and Energy

Evaluate and compile reports on the action plans and monitoring reports uploaded by local authorities on MyCovenant (the monitoring platform of the GCoM). Development of GCoM impact reports and relevant analysis of climate and energy action at local level. Capacity building on monitoring of implementation of SECAPs. Co-chair the Data Technical Working Group and contribution to other initiates of GCoM on research and innovation.

Type of Action: Provision of technical/scientific services by the Joint Research Centre

Indicative timetable: 1st quarter 2026

Indicative budget: EUR 1.00 million from the 2026 budget

8. Sustainable and circular solar PV and wind energy: unifying LCA and s-LCA methodologies

The execution of Life Cycle Assessment (LCA) studies is often done in a non-transparent way following different methodologies and leading to non-comparable results. Currently, the social impacts of PV systems and wind energy systems are not comprehensively assessed, primarily due to the complexity of capturing social data and the lack of standardized methodologies like Social Life Cycle Assessment (S-LCA). There is a need therefore to achieve standardised and internationally recognized guidelines and methodologies for LCA and S-LCA of PV and wind energy technologies across the whole value chain to facilitate consistent, understandable, and comparable results.

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

1. Clear and open guidelines and methodologies for LCA and S-LCA of PV and wind energy technologies to facilitate consistent, understandable, and comparable results contributing to a sustainable PV and wind energy value chain.
2. Support the use of non-price criteria for auctions for the deployment of PV and wind energy as well as public procurement procedures where PV or wind energy is part of the subject matter of the contract, as defined in the Net-Zero Industry Act

Scope: Proposals are expected to produce:

- Comprehensive databases to support the LCA and S-LCA approach, addressing the high data requirements and overcoming the challenges posed by the current lack of foundational databases, data subjectivity, and privacy constraints;
- A unified LCA methodology for established and novel PV and wind energy technologies;
- A S-LCA methodology for established and novel PV and wind energy technologies.

The project must seek for integration with the current activities of the European Commission on LCA, for instance the Product Environmental Footprint methodology.

Type of Action: Provision of technical/scientific services by the Joint Research Centre

Indicative timetable: 2nd quarter 2027

Indicative budget: EUR 1.00 million from the 2027 budget

9. Support for the transition towards CCAM

This action aims to provide scientific and technical support from the JRC to EU policies supporting the transition towards Connected, Cooperative, and Automated Mobility (CCAM) in road transport. Activities will be carried out in coordination with key European actors in this field, including the CCAM Partnership and other relevant stakeholders.

A key element of this initiative will be the operation of the CCAM Technology Observatory, jointly set up by DG RTD and the JRC. The Observatory will play a strategic role by mapping the global CCAM technology landscape, analysing its full technology stack, monitoring innovation trends, particularly in the start-up ecosystem, and identifying areas where Europe maintains or can build competitive advantages. Its insights will be instrumental in shaping future policy, guiding investment decisions, and informing international collaboration.

Type of Action: Provision of technical/scientific services by the Joint Research Centre

Indicative timetable: 3rd quarter 2027

Indicative budget: EUR 0.50 million from the 2027 budget

10. Clean Energy Technology Observatory

Further development of the Clean Energy Technology Observatory on the technologies needed for the delivery of the European Clean Industrial Deal and European Green Deal. The observatory should monitor EU research and innovation activities in clean energy technologies, including EU project achievements; assess the competitiveness of the EU clean energy sector and its positioning in the global energy market; contribute to the monitoring of the Net-Zero Industry Act and support the implementation of the SET Plan. It will build on the current Clean Energy Technology Observatory action and other related Commission activities.

Type of Action: Provision of technical/scientific services by the Joint Research Centre

Indicative timetable: 3rd quarter 2026

Indicative budget: EUR 5.20 million from the 2026 budget

11. European Storage Inventory – Operational Phase

The European Storage Inventory will enter in the operational phase and surveys and maps energy storage R&I and feeds into the work of the Clean Energy Technology Observatory in

highlighting major developments in storage R&I, observed trends and their assessment, as well as an assessment of the annual deployment of storage and total cumulative storage stock across the EU.

Type of Action: Provision of technical/scientific services by the Joint Research Centre

Indicative timetable: 3rd quarter 2026

Indicative budget: EUR 0.50 million from the 2026 budget

12. Administrative Agreement with the JRC on bilateral charging or Vehicle-to-Grid (V2G) activities

Smart bilateral charging or Vehicle-to-Grid (V2G) technology plays a major role in the increasingly electrified energy systems largely relying on renewable energy sources, with a high share of intermittent renewables.

In order to ensure an world-wide, efficient standardisation of V2G, IEA set up Task 53: Interoperability of Bidirectional Charging (INBID) – EV TCP under the Electric Vehicle Technology Collaboration Programme (EV TCP – Electric Vehicles Technology Collaboration Programme) as a no-profit, fee-based organisation, which is a unique case of cooperation still involving the EU, US and China to the benefit of the ecological transition, to ensure interoperability. The European Commission joined the EV TCP in 2024 and is actively participating to Task 53 with DGs RTD, MOVE, ENER, CLIMA, and the JRC.

The objective of this proposed initiative is to set-up a structure able to act as reference laboratory for V2G testing including on interoperability, interference, safety and cybersecurity, able at catalysing and speeding up the development and deployment of standardised devices for all the bilateral charging technologies, at different power level, both AC and DC, wired and wireless.

The cost for the initial testing linked to the global V2G harmonisation shall also be supported. At the same time the Administrative Agreement shall allow the support of all the complementary studies useful to:

- assess the remaining standardisation needs,
- accompany the existing testing and bridge the gap between technologies and the current on-going standardisation activities,
- provide the basis for a V2G policies including sound scientific knowledge on its impacts, costs and benefits,
- support the European Commission in the definition of the remaining elements for harmonisation of V2G in European legislation.

Type of Action: Provision of technical/scientific services by the Joint Research Centre

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Indicative timetable: 1st Quarter 2026

Indicative budget: EUR 1.00 million from the 2026 budget

13. Scientific support to the preparation of the 2nd European Climate Risk Assessment by the EEA

The aim of this administrative arrangement is to apply JRC scientific capabilities to contribute to the 2nd European Climate Risk Assessment, prepared by the EEA for release in Q2 2028. It will ensure that all relevant JRC work across policy areas is provided to the lead authors, as well as targeted reviews. Complementing internally mobilised resources, it will specifically provide authors and coauthors, as well as dedicated additional research contributions and gap-filling. The JRC should take into account the outputs of the relevant Horizon Europe projects.

Type of Action: Provision of technical/scientific services by the Joint Research Centre

Indicative timetable: Q1 2026 for the AA; duration until end of 2028

Indicative budget: EUR 0.30 million from the 2026 budget

Expert contract actions

1. 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 and 1st quarter of 2027

Indicative budget: EUR 3.00 million from the 2026 budget and EUR 3.50 million from the 2027 budget

2. 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.

Form of Funding: Other budget implementation instruments

Type of Action: Expert contract action

Indicative timetable: 1st quarter 2026 and 1st quarter 2027

Indicative budget: EUR 0.25 million from the 2026 budget and EUR 0.25 million from the 2027 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 2026 and 1st quarter 2027

Indicative budget: EUR 0.06 million from the 2026 budget and EUR 0.06 million from the 2027 budget

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Budget[309] [310]

	Budget line(s)	2026 Budget (EUR million)	2027 Budget (EUR million)
Calls			
HORIZON-CL5-2026-03		175.32	
	from 01.020250	*175.32*	
HORIZON-CL5-2026-04-Two-Stage		24.00	
	from 01.020250	*24.00*	
HORIZON-CL5-2026-05		154.00	
	from 01.020250	*154.00*	
HORIZON-CL5-2026-06-Two-Stage		22.00	
	from 01.020250	*22.00*	
HORIZON-CL5-2026-07		86.00	
	from 01.020250	*86.00*	
HORIZON-CL5-2026-08-Two-Stage		45.00	
	from 01.020250	*45.00*	
HORIZON-CL5-2026-09		132.19	

309 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 2026 and 2027.

310 The contribution from Cluster 5 for year 2026 is EUR 232.59 million for the Missions work programme part and EUR 42.79 million for the New European Bauhaus Facility and Horizontal Activities work programme part.
The contribution from Cluster 5 for year 2027 is EUR 234.97 million for the Missions work programme part and EUR 41.92 million for the New European Bauhaus Facility and Horizontal Activities work programme part.

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	from 01.020250	*132.19*	
HORIZON-CL5-2026-10		250.91[311]	
	from 01.020250	*250.91*	
HORIZON-CL5-2026-11		243.00	
	from 01.020250	*243.00*	
HORIZON-CL5-2027-01			123.00
	from 01.020250		*123.00*
HORIZON-CL5-2027-02			218.27
	from 01.020250		*218.27*
HORIZON-CL5-2027-03			134.00
	from 01.020250		*134.00*
HORIZON-CL5-2027-04-Two-Stage			43.18[312]
	from 01.020250		*43.18*
HORIZON-CL5-2027-05			96.09
	from 01.020250		*96.09*
HORIZON-CL5-2027-06			37.50
	from 01.020250		*37.50*
HORIZON-CL5-2027-07			186.00

311 To which EUR 15.00 million from the 'Digital, Industry and Space' budget will be added making a total of EUR 265.91 million for this call.

312 To which EUR 10.00 million from the 'Digital, Industry and Space' budget will be added making a total of EUR 53.18 million for this call.

	from 01.020250		*186.00*
Contribution from this part to call HORIZON-HLTH-2027-01 under Part 4 of the work programme			10.00
	from 01.020250		*10.00*
Other actions			
Public procurement		10.50	3.30
	from 01.020250	*10.50*	*3.30*
Indirectly managed action		58.60	
	from 01.020250	*58.60*	
Subscription action		2.70	2.70
	from 01.020250	*2.70*	*2.70*
Provision of technical/scientific services by the Joint Research Centre		10.72	4.38
	from 01.020250	*10.72*	*4.38*
Expert contract action		3.25	3.75
	from 01.020250	*3.25*	*3.75*
Service Level Agreement		0.06	0.06
	from 01.020250	*0.06*	*0.06*
Estimated total budget		1218.25	862.23

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