Destination - Circular economy and bioeconomy sectors

This destination and its topics target climate-neutrality, zero pollution[220], fair and just circular and bioeconomy transitions[221]. These cover safe, integrated circular solutions at territorial and sectoral levels, for important material flows and product value chains, such as i) textiles, ii) electronics, iii) chemicals, iv) packaging, v) tourism, vi) plastics and construction, and vii) key bioeconomy sectors such as a) sustainable bio-based systems[222], b) sustainable forestry, c) small-scale rural bio-based solutions, d) environmental services and e) aquatic (including marine and freshwater) value chains[223].

The destination supports the European Green Deal, and in particular:

- the new EU Circular Economy Action Plan (CEAP), adopted in March 2020, and the subsequent initiatives along the entire life cycle of products[224];
- the EU strategy on adaptation to climate change adopted in February 2021[225];
- the EU zero pollution action plan[226], adopted in May 2021, with the chemicals strategy for sustainability[227] from October 2020 and the new approach for a sustainable blue economy[228] adopted in May 2021;
- the EU forest strategy for 2030[229]: research and innovation will be key drivers in achieving the ambitious goals of this strategy;

220 See also Destination 'Clean environment and Zero pollution' of this Cluster.

221 Synergies ensured with Horizon Europe Clusters 4 and 5 (including their European public private partnerships), while Cluster 4 targets the industrial dimension (including digitalisation, circularity and climate-neutrality / low GHGs emissions industry transition, including developing bio-integrated manufacturing). Cluster 5 covers cost-efficient, net zero-GHGs energy systems, centred on renewables (including the R&I needed to reduce CO_2 emissions from the power and energy-intensive industry sectors, such as solutions for capturing, utilising and storage of CO_2 (CCUS), bioenergy/biofuels and other industrial sectors) Cluster 6 covers the research and innovation based on sustainable biological resources (bioeconomy sectors), in particular for new sustainable feedstock development and valorisation through the development of integrated bio-refineries).

222 In synergy and complementarity with the EU public-private partnership for a 'Circular Bio-based Europe' (CBE JU), (especially as related to the size of actions – IAs and RIAs, and Technology Readiness Level and the industrial-focus of activities, with the first CBE calls expected in 2022).

223 In synergy and complementarity with the EU partnership for a climate-neutral, sustainable and productive blue economy and with the EU mission 'Restore our Ocean and Waters by 2030'.

224 It targets how products are designed, promotes circular economy processes, encourages sustainable consumption, and aims to ensure that waste is prevented and the resources used are kept in the economy for as long as possible. This plan also aims to ensure that the circular economy works for people, regions and cities, fully contributes to climate-neutrality, zero pollution and resource use decoupling and harnesses the potential of research, innovation and digitalisation

225 COM(2021)82 final "Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate".

226 COM(2021)400 final 'Pathway to a Healthy Planet for All EU Action Plan: "Towards Zero Pollution for Air, Water and Soil'.

227 COM(2020) 667 final 'Chemicals Strategy for Sustainability Towards a Toxic-Free Environment'.

228 COM(2021)240 final 'On a new approach for a sustainable blue economy in the EU Transforming the EU's Blue Economy for a Sustainable Future'.

229 COM(2021)572 final 'New EU Forest Strategy for 2030'.

- the EU climate law targeting climate-neutrality by 2050 and AFOLU [230] climate-neutrality by 2035, which supports increased focus on bio-based circular consumption, as part of the Fit for 55 package proposed on 14 July 2021[231];

- the new European Bauhaus initiative[232] and the renovation wave[233].

Furthermore, the Horizon Europe work programme for 2023-2024 of will play a critical role in implementing the EU strategy for sustainable textiles[234], which highlights the strategic role Horizon Europe initiatives play in R&I in the textile ecosystem. Textiles are the fourth highest category as regards pressure on the use of primary raw materials and water and fifth for GHG emissions, and are a major source of microplastic pollution in production and use phases. They are also a key material and product stream in the circular economy action plan. Improvements in the circularity of the textile value chains will help reduce GHG emissions and environmental pressure. The framework is established in the strategy for sustainable textiles, The transition pathway is a multistakeholder process, that could support implementation Attention should be paid to ensuring a circular, safe and sustainable design and the use of new sustainable biobased materials, as well as to collection, sorting and upcycling. Automated processes and digital solutions should help increase reuse and recycling. The safe-and sustainable-by-design concept aligns circular, safety and bioeconomy approaches with zero pollution. R&I can link various EU policies, namely those related to the green and digital transition, resilience and competitiveness. Under the proposed Ecodesign Sustainable Product Regulation (SPI)[235] the Commission will set out ecodesign requirements on design in order to reduce the environmental footprint of products, striving for products to be kept in circular use for as long as possible.

The wide range of EU initiatives supported by this destination includes:

- the industrial strategy;

- the EU chemicals strategy for sustainability;

- the SME strategy;

- the revised (2018) bioeconomy strategy[236] and its action plan;

---

230 AFOLU: “Agriculture, Forestry and Other Land Use”.

231 COM(2021)550 final “'Fit for 55': delivering the EU's 2030 Climate Target on the way to climate neutrality”.

232 COM(2021)573 final “New European Bauhaus Beautiful, Sustainable, Together”.

233 COM(2020)662 final “A Renovation Wave for Europe - greening our buildings, creating jobs, improving lives”.

234 COM(2022)141 final “EU Strategy for Sustainable and Circular Textiles”.

235 COM(2022)142 final Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing a framework for setting ecodesign requirements for sustainable products and repealing Directive 2009/125/EC .

236 European Commission, Directorate-General for Research and Innovation, European bioeconomy policy: stocktaking and future developments: report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2777/997651.

- the communication on sustainable carbon cycles;
- the sustainable blue economy approach and its offshoot initiatives;
- the EU biodiversity strategy for 2030;
- the farm to fork strategy;
- the upcoming EU agenda for tourism;
- the plastics strategy and the action plan on critical raw materials.

In addition, this destination will contribute to the transition pathways of energy-intensive industries, textiles, construction and agri-food industrial ecosystems.

Where appropriate, proposals are encouraged to cooperate with the European Commission Knowledge Centre for Bioeconomy, also for the purpose of dissemination and exploitation of results.

Expected impact

Proposals for topics under this destination should set out a credible pathway to:

- develop the circular economy and bioeconomy sectors;
- ensure natural resources are used and managed in sustainable and circular manner;
- prevent and remove pollution;
- unlock the full potential and benefits of the circular economy and the bioeconomy, with clean secondary raw materials, ensuring competitiveness and guaranteeing healthy soil, air, fresh and marine water for all, through better understanding of planetary boundaries and wide deployment and market uptake of innovative technologies and other solutions, notably in primary production (forestry) and bio-based systems.

More specifically, the proposed topics should contribute to one or more of the following impacts:

- **Regional, rural, local/urban and consumer-based transitions are accelerated** towards a sustainable, regenerative, inclusive, just and clean circular economy and bioeconomy across all regions of Europe. Special attention should be paid to the most sensitive/vulnerable [237] and greenhouse gas-intensive regions, based on **better knowledge and understanding of science**, and improved capacity to design, implement and monitor policies and instruments for circular and bio-based transitions.

[237] Taking into account all aspects of sustainability, i.e. social, economic and environmental, and in particular sensitivity/vulnerability to the effects of the climate change, as well as due to the current social dependency on fossil resources, especially in remote, rural and low-income regions and cities.

- **European industrial sustainability, competitiveness and resource independence are strengthened** by reducing the use of primary non-renewable raw materials and greenhouse gases emissions and other pollutants, achieving an improved environmental footprint (including on biodiversity), enabling climate-neutrality, zero pollution[238] and higher resource efficiency. This will also be supported by increasing circular and bio-based practices in textiles, plastics, electronics and construction, developing further on industrial symbiosis as well as circularity and sustainability by design, cascading use of biomass and, clean secondary raw materials, along and across value chains.

- **Innovative and sustainable value-chains are developed in the bio-based sectors** replacing fossil-based value chains, increasing circular bio-based systems from sustainably sourced biological resources, and replacing carbon-intensive and fossil-based systems. Such a development will be supported through R&I in **biotechnology** and other enabling technologies, which is a prerequisite and driver of future solutions for a circular economy and the bioeconomy transition. This will involve with inclusive engagement with all stakeholders, including policymakers and will increase access to finance and technical support along whole supply chains for bioeconomy projects.

- **The benefit for consumers and citizens, including those in rural areas, are improved** by establishing circular and bio-based systems based on sustainability, inclusiveness, zero pollution[239], health and safety. All value chain actors (manufacturers, retailers, service industry, consumers, public administration, including on regional level, primary biomass producers etc.) are involved to a significantly higher degree.

- **Multi-functionality and management of forests in Europe are safeguarded** based on the three pillars of sustainability (economic, environmental and social), in particular to optimise the contribution of forests and the forest-based sector in mitigating and adapting to climate change.

- **Potential of marine and freshwater biological resources and blue biotechnology is enlarged** to i) deliver greener (climate-neutral and circular) industrial products and processes, ii) help characterise, monitor and sustain the health of aquatic ecosystems for a healthy planet and people, and iii) help in the drafting of proposals for accompanying changes in regulation where necessary.

The following call(s) in this work programme contribute to this destination:

Call	Budgets (EUR million)		Deadline(s)
	2023	2024	
HORIZON-CL6-2023-CIRCBIO-01	98.50		28 Mar 2023

238 See also Destination 4 ‘Clean environment and Zero pollution’ of this Cluster.
239 See also Destination 4 ‘Clean environment and Zero pollution’ of this Cluster.

HORIZON-CL6-2023-CIRCBIO-02	80.00		28 Mar 2023 (First Stage) 26 Sep 2023 (Second Stage)
HORIZON-CL6-2024-CIRCBIO-01		74.50	22 Feb 2024
HORIZON-CL6-2024-CIRCBIO-02		73.00	22 Feb 2024 (First Stage) 17 Sep 2024 (Second Stage)
Overall indicative budget	178.50	147.50	

Call - Circular economy and bioeconomy sectors

HORIZON-CL6-2023-CIRCBIO-01

Conditions for the Call

Indicative budget(s)[240]

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million)[241]	Indicative number of projects expected to be funded
		2023		
Opening: 22 Dec 2022 Deadline(s): 28 Mar 2023				
HORIZON-CL6-2023-CircBio-01-1	CSA	2.50	Around 2.50	1
HORIZON-CL6-2023-CircBio-01-10	CSA	2.00	Around 2.00	1
HORIZON-CL6-2023-CircBio-01-11	RIA	8.00	Around 4.00	2
HORIZON-CL6-2023-CircBio-01-12	RIA	12.00	Around 6.00	2
HORIZON-CL6-2023-CircBio-01-13	RIA	12.00	Around 6.00	2
HORIZON-CL6-2023-CircBio-01-14	RIA	4.00	Around 4.00	1
HORIZON-CL6-2023-CircBio-01-2	IA	18.00	Around 6.00	3
HORIZON-CL6-2023-CircBio-01-3	CSA	2.00	Around 2.00	1
HORIZON-CL6-2023-CircBio-01-4	RIA	4.00	Around 4.00	1
HORIZON-CL6-2023-CircBio-01-5	IA	10.00	Around 5.00	2
HORIZON-CL6-2023-CircBio-01-6	CSA	3.00	Around 1.50	2

240 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 years 2023 and 2024.

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

HORIZON-CL6-2023-CircBio-01-7	CSA	3.00	Around 1.50	2
HORIZON-CL6-2023-CircBio-01-8	IA	10.00	Around 5.00	2
HORIZON-CL6-2023-CircBio-01-9	RIA	8.00	Around 4.00	2
Overall indicative budget		98.50		

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

Enabling a circular economy transition

Proposals are invited against the following topic(s):

HORIZON-CL6-2023-CircBio-01-1: Enhancing collaboration between Circular Cities and Regions Initiative's (CCRI) supporting organisations

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 2.50 million.

Type of Action	Coordination and Support Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: Proposals funded under this topic must form part of the instruments for the implementation of the European Commission's Circular Cities and Regions Initiative (CCRI). This means that: • Proposals must cooperate with CCRI and its Coordination and Support Office (CCRI-CSO) by means of sharing with this initiative knowledge and experiences gained through the implementation of the CSA, as well as participating in the CCRI's main events (e.g. general conferences and coordination meetings). • Proposals must ensure the proposed activities are complementary to those of the CCRI Coordination and Support Office. • Proposals must clearly specify how the CSA will ensure synergies and complementarities with other circular economy projects and initiatives (incl. those recognised as CCRI projects and CCRI Associated Partners). Applicants must integrate explicitly these obligations into their proposal's work plan.
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). [242].

Expected Outcome: Successful proposal will support the delivery of solutions to implement the European Green Deal, the EU circular economy action plan (CEAP) and the EU bioeconomy strategy. The topic will support the transition towards a sustainable, regenerative, inclusive and just circular economy at local and regional scale across the EU and Associated Countries.

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

[242] 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

- Strengthened collaboration and complementarity between various relevant initiatives and organisations that support circular economy at the local and regional scale;
- Enhanced support to the implementation of circular systemic solutions in cities and regions through the streamlining and creation of synergies with/between the activities of other relevant initiatives and organisations;
- Increased capacity, efficiency and efficacy of organisations that support circular economy at the local and regional scale, e.g. research and technology organisations, associations of cities and regions, other support organisations providing technical assistance to urban and regional circular economy initiatives and projects;
- Enhanced knowledge transfer and exchange of best practices between organisations that support circular economy at the local and regional scale;
- More widespread dissemination of circular innovation, including technological, business, governance and social innovation, which lead to an uptake and easier replication, scalability and visibility of circular systemic solutions and hence multiplication of their economic, social and environmental benefits at the local and regional scale;
- Increased contribution of the Circular Cities and Regions Initiative (CCRI) scheme to the policy targets of the European Green Deal, particularly the circular economy action plan, the industrial strategy and the bioeconomy strategy at local, regional, national, European and international levels.

Scope: As part of the EU circular economy action plan, the Circular Cities and Regions Initiative (CCRI)[243] supports the implementation of circular systemic solutions at the local and regional levels by providing financial and technical assistance to cities and regions in the EU and Associated Countries. The CCRI Coordination and Support Office (CCRI-CSO) is responsible for facilitating the implementation of the CCRI and supporting the cooperation, synergies and complementarities between the CCRI Pilot Group and Fellows, CCRI Projects and Associated Partners. In particular, the CCRI-CSO is responsible for providing practical and tailor-made support to the Pilot Group. The CCRI-CSO also helps to identify and analyse the main R&I gaps as well as the (technical, regulatory and financial) barriers and drivers to a local circular economy.

There is a wide range of organisations in Europe that focus on circular economy at the local and regional scale and have the potential to contribute to CCRI, by implementing activities ranging from political engagement, networking, dissemination, research, support to the development and implementation of circular economy action plans and other circular innovative solutions on the ground.

243 https://ec.europa.eu/info/research-and-innovation/research-area/environment/circular-economy/circular-cities-and-regions-initiative_en.

The objective of this topic is to strengthen the collaboration between various relevant initiatives and organisations that support circular economy at the local and regional scale, enhance their capacity to contribute to CCRI, while avoiding overlaps and duplications in their activities. Proposals should build on the activities of the CCRI-CSO, and ensure the proposed activities are complementary. Proposals should set out a clear plan on how they plan to collaborate with the CCRI-CSO, CCRI Pilots and Fellows, CCRI Projects and Associated Partners, for example by undertaking joint activities, workshops or common communication and dissemination activities and/or providing additional technical expertise through dedicated support activities. Selected proposal will thus need to work together with the above-mentioned CCRI counterparts and, if needed, refine their work plan together with the Commission. All the proposals' activities must be coordinated and implemented in close cooperation and coordination with the CCRI-CSO, as well as explore the possibilities to further build on and make use of outputs produced, in order to ensure complementarities.

Proposals should:

- Ensure close cooperation with CCRI and its Coordination and Support Office (CSO), and contribute to CCRI´s goals and activities, for instance by participating in relevant activities and sharing knowledge that can be transferred to the Pilot Group and Fellows and beyond;

- In cooperation with the CCRI-CSO, facilitate exchange of knowledge and best practices on circular economy innovation, including innovative technologies, business models and governance as well as methodologies for supporting local and regional initiatives based on the latest knowledge in management, behavioural science and other relevant areas;

- In collaboration with the CCRI-CSO, provide technical support to local and regional circular economy initiatives in order to increase the chance of success of circular systemic solutions. The projects should complement the support provided by CCRI-CSO to Pilot Group and Fellows, either by targeting cities and regions not already included in the list of CCRI Pilot Group and Fellows supported by the CSO and/or covering additional circular economy topics and dimensions not already addressed by the CCRI-CSO;

- Organise workshops, webinars, trainings, capacity-building and/or peer-learning activities in coordination with the CCRI-CSO, in order to support the development and implementation of circular systemic solutions as well as facilitate knowledge and experience transfer for further outreach and replication in European territories;

- Develop in cooperation with the CCRI-CSO relevant case studies of local and regional circular economy measures, activities and policies, identifying and presenting the respective strengths and weaknesses. These case studies could be used for their replication and dissemination across the EU and Associated Countries;

- Support the CCRI-CSO in the development of guidance and policy recommendations for local and regional authorities on how to address identified technical, regulatory, and

financial obstacles to the transition to the circular economy as well as on the development and the implementation of circular economy initiatives at a local and regional scale;

- Promote in collaboration with the CCRI-CSO the concept of circular economy to cities and regions that are in the early stage of circular economy transition to help them build their understanding of the concept and the opportunities and chances of a circular system.

The target group of this topic includes organisations that support circular economy at the local and regional scale. These may include: research and technology organisations, associations of cities and regions, other organisations providing technical assistance to local and regional circular economy initiatives and projects. Proposals should ensure that all evidence, information and project outcomes will be accessible through the CCRI website.

Among other entities, organisations that have already received funding from Horizon 2020 or Horizon Europe under CCRI demonstration and project development assistance topics (LC-GD-3-2-2020; HORIZON-CL6-2021-CIRCBIO-01-01; HORIZON-CL6-2021-CIRCBIO-01-02) and/or are currently officially one of the CCRI Associated Partners can be eligible for this topic.

In this topic, the integration of the gender dimension (sex and gender analysis) in research and innovation content is not a mandatory requirement.

HORIZON-CL6-2023-CircBio-01-2: One hundred circular model households: making European households sustainable through inclusive circular practices

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
Technology Readiness Level	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B.

Expected Outcome: A successful proposal will contribute to the following Destination impacts: i) accelerate regional, rural, local/urban and consumer-based transitions, and ii) improve on consumer and citizen benefits.

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

- Significant, well-documented increase in material efficiency in participating households;

- Significant reduction of emissions of GHG and other pollutants, including micro- and nanoplastic fibres from covered households, and increase of carbon removals;
- Improvement of living conditions in participating households;
- Multiplier effect regarding the replication of the approach and its benefits; leading by example;
- Lessons learnt for a European rollout strategy and integration with sectoral strategies such as Circular Cities and Regions Initiative (CCRI).

Scope: The transition from a take-make-waste society to sustainability, resource-efficiency and circularity will have to happen on the ground in the living environment, i.e. at the consumers' homes, or it will not happen at all. We therefore should reduce the environmental footprint of households, and think about an ambitious GHG reduction target for households that could be tested at large scale via research and innovation funding. Areas to be addressed are e.g., household electronics, textiles, food, packaging and the respective waste, furniture, housing, modes of consumption in general, at the level of individual behavioural decisions. The feasibility of this approach should be demonstrated in pilots with NGOs and CSOs that directly target transformation in a certain number of individual households.

Although technology can contribute, the overall goal can only be achieved through behavioural change. Social and gender aspects are relevant. Proposals should demonstrate how sustainable products and/or services can better meet the real needs of citizens with regard to entertainment, communication, mobility, housing, etc., and how in return this will positively influence consumer behaviour.

This initiative complements the envisaged circular and biobased transition activities in cities and regions at a micro level, as it aims to target individual households. In this way, it will also target social disparity. It will experiment with different behavioural approaches in a scheme of 100 circular households. This R&I initiative will also support the Commission's commitment in the 2020 circular economy action plan (CEAP) to present measures to make circularity work for people, regions and cities, to develop a sustainable product policy framework, to empower consumers and public buyers, and to focus on areas where the potential for circularity is high.

Through this initiative, a cost-free circular economy advisory service shall be provided to selected households. As a first step, all available knowledge on the measurement and calculation of greenhouse gas emissions and other environmental impacts from households, with particular attention to the above-mentioned consumption areas, will be screened and consolidated. A simple and robust method for a quick comparison of environmental impacts, using in particular PEF expertise, will be established.

Proposals shall define the exact scope of demonstration projects, e.g., to transform X households in Y Member States into model circularity/sustainability cells, with a focus on a limited number of material flows, and set reduction benchmarks that are ambitious and

plausible, and that can be validated using the above-mentioned knowledge. In a second step, a support service directly targeted at citizens will be established. Similar to energy advisory services, material efficiency advisors will contact households and identify individual needs and optimisation potential. This can build on the infrastructure of the upcoming Circular Cities and Regions Initiative and other projects that operate at macro level, and on ongoing environmental NGO advisory activities. While the focus is on material flows, trade-offs between material and energy efficiency are to be avoided. All proposed measures have to respect the principles of non-toxicity and zero-pollution. The impact of all measures should be assessed from a lifecycle perspective.

The advisors will be the link between retailers/service providers, insurances etc., where necessary also public services and administration, and households. All proposed measures need to be easy to implement and at least cost-neutral for households. Measures will range from environmentally friendly purchasing, shared product use, swaps to optimised maintenance, upgrade, repair, down to waste disposal. Financing of significant expenses that can be a barrier to transition at household level, and amortisation issues need to be addressed in the context of the advisory service. The aim is also to debunk the notion that sustainable living is a privilege of the wealthy.

In a third step, results will be analysed and presented in a robust way that allows multiplication both through media initiatives and on the ground, via public authorities or directly by individual actors who want to replicate and implement successful circular measures in their remit. With regard to the territorial aspects of all proposed solutions, proposals should seek to contribute to the goals and cooperate with the services of the European Commission's Circular Cities and Regions Initiative (CCRI)[244]. Joint activities with CCRI projects are encouraged.

The targeted TRL at the end of the projects is 6 to 8.

HORIZON-CL6-2023-CircBio-01-3: Harnessing the innovation potential and market uptake of successful circular economy water related projects

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
Legal and financial set-up of the Grant	The rules are described in General Annex G. The following exceptions apply:

244 https://circular-cities-and-regions.eu/.

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). [245].

Expected Outcome: In support of the European Green Deal and EU water-related policies, successful proposals will contribute achieving sustainable and circular management and use of water resources, as well as prevention and removal of pollution, in particular the expected impact of the Destination 'Circular economy and bioeconomy sectors' to 'Accelerate transitions towards a sustainable, regenerative, inclusive, just and clean circular economy based on enhanced knowledge and understanding of science'.

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

- Boost the uptake of the most promising systemic solutions, innovative recovered products and related business models for sustainable wastewater treatment, recovery and reuse, removing relevant barriers and create a level playing field for innovative companies;
- Change perception and behaviour of European citizens, removing social barriers with regard to wastewater management, recovery and the reuse of resources and energy
- Enhance collaboration and knowledge sharing on water reuse and recovery, education, awareness, and professional skills development;
- Support the implementation of relevant EU policies (e.g., water and marine related policies, water reuse regulation, sludge and industrial emissions directive, climate change adaptation strategy, circular economy action plan, EU bioeconomy strategy and its action plan, EU zero pollution action plan).

Scope: The water sector is facing important transformations in order to ensure resource efficiency, food and water security and meet relevant targets of the EGD. Transitioning to a circular economy and bioeconomy present a big opportunity for that.

Past and ongoing EU funded projects demonstrated the benefits of applying circular economy and bioeconomy principles to water systems and provided interesting case studies on various circular water management approaches and business models, and insights on how materials, water, energy, products and components can be managed in such a way, they can maintain their highest possible intrinsic value. However, the uptake of innovative circular water solutions (e.g., recovered products) is hindered by the lack of a common understanding of

[245] 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

benefits of systemic solutions and the lack of a systematic analysis of the various, technological, regulatory and social barriers. Raising, for instance, public awareness, stakeholder and business engagement on the use of recovered products (water, nutrients, other resources) is crucial for overcoming social barriers and other regulatory ones as well as for enabling policy developments.

There is therefore the need to create a critical mass for knowledge exchange, to further promote the dissemination and exploitation of EU funded research results, to remove social barriers, facilitate their use by various stakeholders, reduce unnecessary duplication of efforts, ensure/demonstrate public and stakeholders engagement in developing business opportunities of circular use of water and identify wider policy implementation opportunities as well as, opportunities to accelerate and scale-up various scientific and technological advances that support greater water efficiency and reuse in various sectors and promote innovation and business development.

This action should bring together relevant business representatives, investors water utilities, policy makers, researchers, technology providers, water utilities, and other water users and citizens from past and ongoing successful EU funded R&I projects on the circular use of water, to take stock of the outcomes of major results with regards to technologies, eco-innovative solutions and related business models for sustainable treatment and practices of stakeholders and water managers involvement, recovery and reuse of relevant resources from wastewater and sewage sludge (e.g., nutrients, metals, energy, etc.). The involvement of relevant EU water EU associations and supporting platforms should be encouraged, as they play an important role in bringing together different stakeholders (industry, science, regulators, consumers and downstream users) and different sectors (recycling technologies, waste industry, user industries and agriculture) for knowledge transfer, dialogue and confidence building utility associations. The inclusion of relevant SSH expertise would be also needed to help achieving the social related expected outcomes of this action.

For achieving these objectives the action should analyse relevant results and experiences and provide guidance related to the transition pathways that would enable water management authorities and utilities to navigate through water, material and energy pathways. Various business models for future replication, use, policy and market uptake of project results, should be also analysed, as well as related regulatory and/or market barriers. Recommendations for best practices to engaging the public and user industries (such as the food industry for nutrients or the biobased industry for biomasses) in co-design and co-creation processes that can speed up the market uptake of the solutions should be provided, as well as recommendations for future research needs.

The action should:

- Assess how digital business models can further support water reuse, energy and resource recovery along the water cycle and help to increase awareness of the water sector operators concerning the water-energy-carbon nexus and longer-term impact of their day-by-day activity and promote actions for their market uptake.

- Assess the social, environmental and economic impacts of various project results and their contribution the aims of various related EU policies. The full cost of service should be considered within the water sector. This includes the capital and operating expenses, cost savings from recovered products, the environmental and social aspects of water cycle management.

- Propose a roadmap, recommendations and guidance on the standardisation of water products, in relation to secondary raw materials from wastewater treatment plants, including standardized key performance indicators and product certification schemes. In this context it would be also useful to assess to what extent, the development of niche markets and decentralised logistics/business models could further support the market uptake of recovered products.

- Propose a roadmap and action plan to address the social perception and related biases of water reclamation and reuse with a view to increasing awareness among various water users and citizens in general.

- Develop new education and training programmes to upskill young professionals in relevant sectors in relation to the circular use of water along the water cycle.

- Define and propose national and EU-harmonized end-of-waste criteria for the recovered materials.

Innovating for sustainable bio-based systems, biotechnology and the bioeconomy

Proposals are invited against the following topic(s):

HORIZON-CL6-2023-CircBio-01-4: Land-based bioprospecting and production of bioactive compounds and functional materials for multiple bio-based value chains

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
Technology Readiness Level	Activities are expected to achieve TRL 3-5 by the end of the project – see General Annex B.

Expected Outcome: A successful proposal will contribute to all Destination 'Circular economy and bioeconomy sectors' impacts related to consumers and industry, in particular to development of innovative and sustainable value-chains in the bio-based sectors and of

European industrial sustainability, competitiveness and EU resource independence / strategic autonomy. It will also contribute via research on biotechnology and other enabling technologies, as a prerequisite and driver of future solutions for the bioeconomy transition.

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

- Enhanced understanding of terrestrial biodiversity and the limits and potentials of its valorisation;
- Addressing the need of sustainable sourcing and development of novel natural, sustainable and 'eco-friendly' (including 'climate-friendly') materials and product ingredients for various sectors and applications. These will eventually deliver clear-cut benefits for consumers by being more effective and/or eco-friendly, cheaper, better for climate, and more readily accessible than existing fossil-based alternatives;
- Improved sustainable exploitation, cultivation and processing methods based on promising species/organisms (including complex inter-species communities), and chosen production routes; leading to a diminished pressure on the natural resources (especially biodiversity) in situ.
- Increased competitiveness of European biotechnology, in particular the SMEs sector.
- Increased public knowledge and awareness of connections between biodiversity and biotechnology and its potentials, leading to increased trust in the scientific approaches based on informed and robust communication and mutual-learning efforts.

Scope: Global terrestrial biodiversity remains a largely untapped source of natural bioactive molecules and compounds, often combined with interesting potential functional properties of high economic and social value. Such chemical diversity and structural complexity may be matched with biological potency and selectivity. While some of the natural biochemical diversity has been studied[246], the potential for developing new applications and products is far from exhausted[247]. There are still significant opportunities to improve the biodiscovery process as well as understanding of specific biochemical pathways leading to high-value applications, especially with those with a reduced Green House Gas (GHG) emissions, in various sectors, based on novel biochemicals and functional bio-based materials.

This will increase capacity in the European biotechnology sector and other industries to respond to society's needs. The challenge is to match sustainable sourcing and processing with efficient and cost-effective use. This calls for close cooperation between industrial and academic partners, with due consideration for health/safety and environmental legislation, and informed public engagement.

---

246 E.g., Horizon 2020 topic FNR-11-2020. Prospecting aquatic and terrestrial natural biological resources for biologically active compounds, ongoing project InnCoCells.

247 European Commission, Directorate-General for Research and Innovation, Wydra, S., Hüsing, B., Aichinger, H., et al, Life and biological sciences and technologies as engines for bio-based innovation, Publications Office, 2021, https://data.europa.eu/doi/10.2777/046454.

Activities should address:

- Technical improvements of the bioprospecting of any land-based organisms for potential bioactive compounds and functional materials, based on identified suitable sources of feedstock. The bioprospecting may be "bio-guided" by the study of chemical ecology interspecific interactions (symbiotic/defence) such as, for instance, plant-insects, or microbial-insect/plant/fungus interactions.

- Addressing sustainable biodiscovery, including by advanced detection methods, such as in silico database analysis, microfluidics/lab-on-chip, high-throughput screening, machine learning, etc, overcoming the issues of low concentrations of target molecules, and their general scarcity, and use of natural biological resources from diverse terrestrial environments and ecosystems, allowing better assessment of the selected bioactivity/functional property potential.

- Defining and assessing the optimal further production routes via innovative approaches and systems/platforms (e.g., biotechnology, hydroponics, bioreactors), as well as economic feasibility assessment of these options for resulting bioactive compounds and functional materials, ensuring full valorisation of biomass and all by-products in the production routes, and biomass' sustainable supply, and, if appropriate, proposing an outline of continuation of the end-product development beyond the project timeline and its present resources.

- Assessing and clearly communicating, by inclusive communication and dissemination strategies, the environmental and climate benefits (e.g., by lowering the pressure on the natural habitats (decrease of harvesting *in situ*), supporting nature conservation, and increase overall resource efficiency and sustainability), while expanding the range of natural ingredients for the new applications in industrial sectors.

- Covering the environmental, climate and safety/health impacts of the developed ingredients or processes, using Life-Cycle Assessment (LCA) methodologies based on available standards, certification, and accepted and validated approaches. Estimate of possible negative environmental impacts and trade-offs should be provided. The need to guarantee biodiversity preservation and compliance with relevant international rules on access to biological resources, their sustainable use and the fair and equitable sharing of benefits from their utilisation, with the national regulations in the source countries and with the Convention on Biological Diversity and its Nagoya Protocol.

- Food, biofuel and bioenergy applications are not in scope. Agricultural crop protection products (chemical pesticide substitutes) are also not in scope, to avoid overlaps with a parallel topic[248]. Marine and aquatic ecosystems are also out of scope to avoid overlap with parallel topics[249] and projects funded under the recent call[250]. For any health-related

[248] HORIZON-CL6-2023-FARM2FORK-01-7: Innovations in plant protection: alternatives to reduce the use of pesticides focusing on candidates for substitution.

[249] Topics under the present Destination, Heading 3 – Innovating for blue bioeconomy and biotechnology value chains.

applications, complementarities with Horizon Europe Cluster 1 'Health' should be carefully explored, to avoid duplications, and seek synergies.

Where relevant, and to increase impact, proposals should seek links and synergies as well as capitalise on the results of past and ongoing research projects[251] (including under the Bio-based Industries Joint Undertaking (BBI JU) / Circular Bio-based Europe Joint Undertaking (CBE JU)).

In this topic the integration of the gender dimension (sex and gender analysis) in research and innovation content is not a mandatory requirement.

HORIZON-CL6-2023-CircBio-01-5: Broadening the spectrum of robust enzymes and microbial hosts in industrial biotechnology

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
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B.

Expected Outcome: A successful proposal will contribute to Destination 'Circular economy and bioeconomy sectors' impacts, in line with the European Green Deal, the EU bioeconomy strategy & its action plan as well as the EU industrial strategy. A proposal is expected to address in particular: i) developing innovative and sustainable value-chains in the bio-based sectors and ii) enhancing European industrial sustainability, competitiveness and resource independence. Expected impacts will be achieved via research and innovation on industrial biotechnology and other enabling technologies, as a prerequisite and driver of future solutions for the bioeconomy transition.

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

- Enhanced EU bio-based sector competitiveness, sustainability and resource independence, including SMEs. More specifically, successful projects will contribute to a paradigm shift from enzymes and industrial microbial-hosts dependent processes to

250 Horizon 2020 topic FNR-11-2020-(B). Prospecting aquatic and terrestrial natural biological resources for biologically active compounds, projects MARBLES, SECRETed, ALGAE4IBD.

251 Horizon 2020 topic FNR-11-2020-(A). Prospecting aquatic and terrestrial natural biological resources for biologically active compounds, project InnCoCells.

evolved microbial hosts and enzymes, for improved (bio-based) process/production robustness and flexibility.

- Enabling environmental performance improvements of bio-based processes (encompassing climate-neutrality, circularity and zero pollution) through resource efficient valorisation of sustainable biomass feedstock, while addressing pollution issues in production processes.

- Long-term benefits to the bio-based sector, consumers and end-users, by more environmentally-friendly as well as more technically and economically feasible applications in diverse value chains, also underpinned by progress in industrial biotechnology.

Scope: The overall scope focuses on widening the range of known robust enzymatic catalysts and industrial microbial hosts,[252] as well as on the potential of scaling up their deployment and thus exploring their potential to offer significant gains in bio-based processes and their flexibility against variable process parameters, namely: resource efficiency, energy efficiency and other process metrics. These efforts will then eventually aim for development of novel, or significantly optimised, sustainable (bio-based) processes and products (e.g. chemicals, materials).

Proposals should address:

- Identification and bioprospecting of novel natural enzymes and/or microbial hosts, including though the use of existing sequencing data, from all types of environments (especially terrestrial but also marine).[253] The identified solutions must especially address extreme habitats (relevant to bio-based processes conditions/ challenges-*see next point*).

- Optimisation of enzymes' and/or microbial hosts' properties for industrial use, addressing (bio-based) process conditions barriers. Such barriers comprise of physical parameters (e.g., temperature, pH) and chemical parameters/stressors (e.g., solvents, variable biomass feedstock composition, contaminants etc.). Optimisation efforts may include understanding, modification and control of microbial hosts and enzymes, (e.g. via Synthetic Biology methodologies).

- Testing and demonstrating of novel concepts for industrial enzyme-catalysed or microbial host-based processes (e.g., engineering of enzyme cascades/multi-enzyme reactions, co-factor regeneration, broader range of functional activity etc.) to valorise biomass and produce high-value bio-based products.

- Demonstrating optimised process design, development and control aspects, with considerations for implementation of automation, integration of unit operations, robust

252 Microbial-hosts: both prokaryotic and eukaryotic organisms such as fungi.

253 For marine environments, please consider any relevant past or ongoing topics under heading 'Innovating for blue bioeconomy and biotechnology value chains (e.g. HORIZON-CL6-2024-CircBio-01-10: Targeting aquatic extremophiles for sourcing novel enzymes, drugs, metabolites and chemicals

and precise process analytical technologies (PAT), and the horizontal incorporation of enabling digital technologies, where necessary for improving process efficiency but also achieving environmental performance improvements.

- Assessment of the tested, optimized enzyme-catalysed or microbial host-based processes with respect to biotechnological, economic, environmental performance (lifecycle assessment) as well as safety parameters and standards.
- Linking to the ongoing work on sustainability improvements via industrial biotechnology[254], if underpinned by the thematic focus on enzymes.
- Beneficiaries should pay attention to the delivery of FAIR data, results and methodologies.

Where relevant, proposals should overall seek links and synergies as well as capitalise on the results of past and ongoing EU research projects[255] of Horizon 2020, LIFE, Horizon Europe (including the Bio-based Industries Joint Undertaking (BBI JU) /Circular Bio-based Europe Joint Undertaking (CBE JU)).

Proposals should also include a dedicated task, appropriate resources and a plan on how they will collaborate with other projects funded under this topic and other relevant topics.

In this topic the integration of the gender dimension (sex and gender analysis) in research and innovation content is not a mandatory requirement.

HORIZON-CL6-2023-CircBio-01-6: Bio-based solutions for humanitarian applications

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 3.00 million.
Type of Action	Coordination and Support Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply:

254 See parallel topic HORIZON-CL6-2023-ZEROPOLLUTION-01-5: Industrial biotechnology approaches for improved sustainability and output of industrial bio-based processes.

255 In particular Horizon 2020 call FNR-16-2020 topic 'Enzymes for more environment-friendly consumer products', H2020-FNR-16-2020 projects, such as: EnXylaScope – 'Mining Microbes and Developing Advanced Production Platforms for Novel Enzymes To Rapidly Unleash Xylans' Potential In a Scope Of Products For the Consumer Market; FuturEnzyme - Technologies of the Future for Low-Cost Enzymes for Environment-Friendly Products, RADICALZ 'Rapid discovery and development of enzymes for novel and greener consumer products'.

	Due to the scope of the topic, legal entities established in low- and middle-income countries (see General Annexes) may exceptionally participate in this Coordination and support action as beneficiaries or affiliated entities. The following additional eligibility criteria apply: the proposals must use the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.
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). [256].

Expected Outcome: Successful proposals will contribute to Destination 'Circular economy and bioeconomy sectors' impacts, including: i) accelerating transitions towards a sustainable, regenerative, inclusive, just and clean circular economy and bioeconomy, ii) developing innovative and sustainable value-chains in the bio-based sectors as well as iii) improving citizen benefits by establishing circular and bio-based systems based on sustainability, inclusiveness, zero pollution.

More precisely, successful proposals will provide humanitarian aid operators and bio-based sector stakeholders, with science-based information on the application potential, sustainable performances and circularity of bio-based solutions and options, suitable for humanitarian purposes. Projects' results will thus contribute to further improve on the social benefits of bio-based systems, in line with the European Green Deal, the bioeconomy strategy, the EU circular economy action plan and the EU zero pollution action plan.

Projects results are expected to contribute to the following expected outcomes:

- Identification of sustainable bio-based solutions of applicable performance under humanitarian aid contexts, addressing the technical challenges posed by diverse environmental, social and economic conditions.
- Improved way to address waste management and waste-related challenges in humanitarian aid contexts.

[256] 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

- Significant reduction/minimisation of waste (e.g., plastic or fibres waste) littered in the environment.

Scope: The global solid waste management crisis (and any related pollution) is increasingly urgent to address and it can disproportionately affect countries that commonly receive humanitarian assistance. Humanitarian aid, including EU-funded aid, is delivered both within EU boundaries and beyond, including to remote areas, posing logistics challenges of waste management. This call would contribute by examining on how bio-based products and systems could contribute to managing environmental challenges relevant to waste in humanitarian contexts. For example, based on existing assessment studies[257], issues pertain with durability of materials compared to the timeframe needed for their integrity to guarantee necessary quality, cost effectiveness of managing waste, prevention of littering, safety to end-users and operators as well reuse, recycling, or biodegradability and composting of waste materials in humanitarian settings.

Proposals should:

- Assess the scope for which bio-based innovative technological solutions as well as bio-based systems have more environmentally sound applicability (including zero pollution and climate change considerations) for different and relevant applications,[258] under humanitarian contexts (scoping exercise).

- Evaluate socio-economic/governance aspects, including the replication potential of appropriate solutions.

- Include appropriate lifecycle assessment methodologies to examine the potential to reduce the environmental impact (accounting also for biodiversity, ecosystems preservation and enhancement, zero pollution as well as greenhouse gas emissions) of proposed solutions, under relevant humanitarian aid conditions (variable environmental, social and economic conditions).

- Develop guidelines and recommendations to policy makers, bio-based sector actors as well as humanitarian aid operators/practitioners (e.g., NGOs). Such guidelines can address further R&D&I needs and socioeconomic considerations, detailing on the potential of bio-based products and bio-based systems for uptake, based on the scoping exercise and a SWOT analysis. For all aforementioned aspects, humanitarian context specificity is crucial and must be taken into account for the analysis.

- Implement multi-actor approach (MAA) by involving a wide range of bio-based sector actors, humanitarian aid actors as well as other relevant stakeholders, accounting also for trans- and inter-disciplinary research.

257 E.g., World Food Programme Environmental Sustainability Unit.
258 E.g. plastic products and packaging, logistic assets, textiles, waste treatment, water treatment etc.

Where relevant, proposals should seek links and synergies as well as capitalise on the results of past and ongoing EU research projects[259] (Horizon 2020, LIFE, Horizon Europe, including the Bio-based Industries Joint Undertaking (BBI JU) / Circular Bio-based Europe Joint Undertaking (CBE JU)).

International cooperation and the consideration of gender-related aspects are highly encouraged. Social Innovation and social science and humanities (SSH) aspects should form an essential part of the funded projects.

HORIZON-CL6-2023-CircBio-01-7: Symbiosis in the bio-based industrial ecosystems

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 3.00 million.
Type of Action	Coordination and Support Actions
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). [260].

Expected Outcome: Successful proposals will enable the bio-based industries in the Union to contribute to the enhancement of European industrial sustainability, competitiveness and resource independence, developing industrial symbiosis and circularity by design and to the development of innovative and sustainable value-chains in the bio-based sectors as a prerequisite and driver of future solutions for a circular economy and the bioeconomy transitions. Projects results will contribute to deliver bio-based solutions with reduced environmental impacts on soil, water, and air quality, biodiversity and climate, in line with the EGD objectives, the EU circular economy action plan, the bioeconomy strategy and the implementation of the transition pathway for the EU chemicals industry.

259 E.g., see also parallel topic HORIZON_CL6-2024-CircBio-01-05 Programmed biodegradation capability of bio-based materials and products, validated in specific environments.

260 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

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

- Innovative processes and industrial symbiosis approaches in the bio-based industrial value chains, enabling local security of supply chains and the maximum valorisation of biological resources while minimizing the use of hazardous substances and waste streams;

- Monitoring systems of the industrial symbiosis in the bio-based industrial value chains.

Scope: In the transition towards an effective circularity and zero pollution within the industrial ecosystems in the Union, the production of goods and services must optimize the use of any resource. Industrial symbiosis is instrumental to this goal, as it is based on the sharing of resources between facilities when wastes or by-products from an industry or industrial process becomes the raw material for another. A well-developed symbiosis across bio-based facilities aims at zero-waste value chains, ensuring more local supply chains, minimizing the use of input material resources, while reducing all the environmental impacts on soil, water, and air quality, biodiversity and climate, of all the processes involved. This should also bring an increase in the economic value of final products and a better distribution of economic and social benefits among the stakeholders. Industrial bio-based facilities within the scope of this topic include those producing bio-based materials and products (e.g., paints, coatings, inks and dyes, polymers, construction materials, fibres, personal care products, plasticisers, adhesive, lubricants, platform chemicals, solvents, surfactants, etc.).

To improve the knowledge for the implementation and scaling up of industrial symbiosis in the bio-based industries proposals should:

- Analyse the applicability of existing methods and approaches individuating and assessing technical solutions enabling the symbiosis to specific sectors/facilities within the bio-based industrial ecosystems (but also their symbiosis with non-bio-based industrial assets), including supported by digital innovation and AI, based on existing studies [261] and on the knowledge collected and elaborated under the European Community of Practice[262] (ECoP);

- Improve existing and/or develop new methods to assess the circularity and symbiosis of bio-based industrial ecosystems, taking into considerations specific KPIs developed in the above-mentioned ECoP;

- Assess and optimize the environmental sustainability of symbiotic processes in terms of (decreased) impacts on soil, water, and air quality, biodiversity and climate;

- Evaluate the economic and social benefits of the industrial symbiosis assets in terms of increased economic value of final industrial products, better distribution of economic

[261] See for example the study "Study and portfolio review of the projects on industrial symbiosis in DG Research and Innovation" https://op.europa.eu/en/publication-detail/-/publication/f26dfd11-6288-11ea-b735-01aa75ed71a1.

[262] See the CSA funded under the topic HORIZON-CL4-2021-TWIN-TRANSITION-01-16: Hubs for Circularity European Community of Practice (ECoP) platform (Processes4Planet Partnership).

and social benefits among the stakeholders, improved utilisation of local supply chains, and integration in local (national and regional) strategies supporting circular approaches;

- Individuate high-potential regions/areas, or specific industrial hubs for the demonstration of the developed symbiotic approach. Criteria for the individuation of such sites should focus on process level, symbiosis process implementation, commitment level of the local authorities and communities, regional specificities (business/industrial policy and strategies), additional funding, potential private investors, etc., also taking stock from the EU Hubs for Circularity (H4C) experiences[263];

- Engage with stakeholders, including local authorities and communities to disseminate the social and economic benefits from innovation in industrial symbiosis, bio-based industries, universities or other educational institutions to facilitate the training of circular practitioners;

- Develop a targeted reporting system of the effectiveness of the technical solutions, based on ad-hoc monitoring capacity along the bio-based value chains working in symbiosis.

Projects are expected to contribute to the New European Bauhaus (NEB) initiative by interacting with the NEB Community, NEB Lab and other relevant actions of the NEB initiative through sharing information, best practices, and, where relevant, results.

Where relevant, proposals should seek links with and capitalise on the results of past and ongoing EU funded projects, including under the Circular Bio-based Europe JU and other partnerships of Horizon Europe and beyond.

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.

In this topic the integration of the gender dimension (sex and gender analysis) in research and innovation content is not a mandatory requirement.

HORIZON-CL6-2023-CircBio-01-8: Eco-friendly consumer products – low-toxicity/zero pollution construction bio-based materials

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.

263 Hubs for circularity - Publications Office of the EU (europa.eu)

Type of Action	Innovation Actions
Technology Readiness Level	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B.

Expected Outcome: A successful proposal will contribute to all Destination 'Circular economy and bioeconomy sectors' impacts related to consumers and industry, in particular to development of innovative and sustainable value-chains in the bio-based sectors and of European industrial sustainability, competitiveness and resource independence, including via research on biotechnology and other enabling technologies, as a prerequisite and driver of future solutions for a circular economy and the bioeconomy transitions.

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

- Higher environmental sustainability, including on the climate targets (primarily reduction of greenhouse gas emissions, and accessorily increase of carbon removals), and zero pollution demonstrated by LCA approaches of bio-based materials and products for construction applications, allowing their intensified sustainable use, under the New European Bauhaus Initiative[264] and the Renovation Wave[265];

- Demonstrated non-toxic and zero-pollution properties of the construction materials, as well as their recyclability and/or reusability, to respond to the higher societal demand and the objectives of the European Green Deal;

- Increased competitiveness of European industry, including SME sector, and involving various actors of bio-based value chains; while ensuring affordable and sustainable end-products for the consumers and society, including via integration of digital solutions;

- Improved innovation potential in regard to biotechnology, and its potential contribution to the sustainable, circular bio-based materials and biochemicals, with safe, environmentally-friendly and functionally performing applications;

- Improved societal innovation and creativity, with inclusive engagement of all societal actors, especially professional bodies, policymakers, designers, architects, consumers and end-users, for the bio-based construction product segments. This is expected to contribute, e.g., by developing recommendations or guidelines, or public engagement/dialogue, to the policy-feedback on innovative construction materials, and to resolving related regulatory bottlenecks.

Scope: Bio-based construction materials offer major opportunities to contribute to the climate-neutral and zero-pollution objectives of the European Green Deal, replacing fossil-based

264 COM(2021)573 final "New European Bauhaus Beautiful, Sustainable, Together". Projects are expected to contribute to the New European Bauhaus (NEB) initiative (https://europa.eu/new-european-bauhaus/index_en) by interacting with the NEB Community, NEB Lab and other relevant actions of the NEB initiative through sharing information, best practice, and, where relevant, results.

265 COM(2020)662 final "A Renovation Wave for Europe - greening our buildings, creating jobs, improving lives".

alternatives, and so, reducing the environmental footprint, while offering economic benefits to the actors involved. However, care needs to be taken to ensure sustainability of sourcing and production process, while guaranteeing safety and positive user experience. This calls for high level of innovation and creativity, ensuring full inclusiveness of participation for all actors.

Proposals will focus on:

- Identification and upscaling of bio-based materials suitable for the construction sector, understood as bio-based feedstocks, e.g. agro-forestry [266] residues, fibres, recycled organic materials, industrial by-products etc, obtained especially by higher circularity of available biomass, under the cascading use of biomass principle. However, the selected materials can also be found in other bio-based resources that, due to their specific genetic / physiological / biochemical backgrounds have functional properties, which can be further improved or upgraded by fermentation, biomanufacturing, or biotechnology approaches. Also, the hybrid integration of living organisms into traditional or bio-based construction materials (e.g., plants, algae, fungi) might be considered, if leading to higher quality and improved environmental impact. The range of final construction materials is broad and may cover composites, insulation materials, interior or exterior elements, adhesives, etc., depending on the construction value chain selected.

- Innovating in terms of bio-based production improvements (e.g., additive bio-based manufacturing, nature-based solutions, or composite materials with added functionalities), leading to new construction-oriented consumer applications. This effort should benefit from innovation developed both from the technical angle, but also from social innovation and from inclusive participation of all actors, including development of recommendations for pre-normative or/and regulatory actions, related to new (recyclable/reusable) bio-based construction materials, as appropriate.

- The safety and user experience aspects should be duly considered and included in the developed solutions.

- Communication and dissemination will form an essential part of the projects, especially as related to the sustainability, 'reconnection with nature' and inclusiveness aspects.

- Proposals should include a dedicated task, appropriate resources and a plan on how they will collaborate with other projects funded under this topic and other relevant topics.

- International cooperation is encouraged to benefit from exchange of best practices, while taking care of European (industrial) competitiveness.

- SSH aspects should be considered and covered, as well as the contribution from digital solutions.

[266] Synergies with R&D on traditional bio-based feedstocks such as wood may be sought, e.g., see topic HORIZON-CL6-2024-CLIMATE-01-5: Climate-smart use of wood in the construction sector, or activities under the Circular Bio-based Europe (CBE) JU.

HORIZON-CL6-2023-CircBio-01-9: Business models that balance the share of power and profit in the bioeconomy

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 8.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: the proposals must use the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Beneficiaries may provide financial support to third parties. The support to third parties can only be provided in the form of grants. The maximum amount to be granted to each third party is EUR 60 000. 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). [267].

Expected Outcome: This topic is supporting the bioeconomy strategy and the common agriculture policy (CAP) by promoting diverse forms of cooperation among primary producers to create value-added bio-based products in fair value chains via advanced biorefineries.

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

- Revitalisation and resilience of rural economies by creating new green jobs and investments.

[267] 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 replicable, scalable production and business models for the operation of biorefineries that offer economic opportunities in rural areas and contribute to a fair distribution of benefits in bio-based value chains.
- Enhanced joint investment in R&D and demonstration plants.
- Linking of underutilised feedstock types with available technologies and market information, improved logistics and quality standards.
- Identification of factors for success and policy recommendations in view of robust contracts and agreements, training and capacity building, shared business plans, marketing strategies for bio-based products as well as financial and legal aspects.
- Climate-neutral land sector by 2035 and climate-neutral economy by 2050.
- Diversification and enhancement of agricultural incomes (organic and conventional farming) and transition towards sustainable food systems in line with the farm to fork strategy.
- Enhanced cooperation between primary producers and other key actors along the value chain in the bio-based economy.

Scope: The circular use of waste, by-products and residues from agriculture, forestry, and the agri-food industry can lead to the creation of new economic opportunities in rural areas. However, primary producers are often not fully integrated in bio-based value chains, and thus, benefits are not sufficiently distributed among value chain actors.

This topic addresses diverse forms of cooperation among primary producers and suitable business models to create high-value bio-based products in vertically integrated value chains via advanced biorefineries.

Proposals will:

- Examine the potential of contractual agreements or fully developed shareholder/ownership concepts (e.g., cooperatives) to create sustainable and competitive innovations in the bio-based economy through the conversion of by-products, residues and wastes from agriculture and forestry.
- Develop and promote business models for different primary production sectors in the EU that build on existing rural infrastructures, support the economies of scale, and contribute to a fair distribution of costs, benefits, and risks amongst the economic operators.
- Contribute to a better understanding of sustainable and fair biobased supply chains, synergetic points along and across agricultural, forestry and industrial value chains as well as industrial symbiosis opportunities.

- Explore existing investment options, including non-traditional sources (e.g., cross-sectoral collaborations, etc.) and identify barriers and enablers for sustainable long-term operations.
- Contribute to restoring carbon content in soil, increasing nutrients, revitalising marginal lands and ensuring food security.
- Consider further socio-economic factors, influencing farmers' behaviour and develop indicators to assess the economic, environmental and social impacts for farmers, foresters and rural areas through increased cooperation.
- Connect with a wide range of stakeholders (farmers, foresters, industry, processors, advisors, clusters, etc.) and develop together a portfolio of research and innovation priorities that can be implemented in Horizon Europe and relevant European partnerships such as the Circular Biobased Europe.
- Promote bioeconomy-related interventions in the new CAP and provide advice and technical guidance for Member States.

Proposals shall apply the concept of the 'multi-actor approach' and ensure adequate involvement of the farming sector, SMEs and other actors active in rural areas.

Proposals may involve financial support to third parties e.g. to primary producers, academic researchers, start-ups, SMEs, and other multidisciplinary actors, to, for instance, develop, test or validate developed applications. Consortia need to define the selection process of organisations, for which financial support may be granted. Maximum 20% of the EU funding can be allocated to this purpose.

Cooperation with other selected projects under this topic is strongly encouraged.

HORIZON-CL6-2023-CircBio-01-10: Supporting the fair and just transition from GHG-intensive economies facing challenges towards circular bioeconomy model regions

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: The following additional eligibility criteria apply: the proposals must

	use the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.
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). [268].

Expected Outcome: Successful proposal will contribute to the expected impacts of Destination 'Innovative governance, environmental observations and digital solutions in support of the Green Deal', and the European policies it supports, by supporting the establishment of the innovative governance models notably to achieve better-informed decision-making processes, social engagement and innovation.

In line with the European Green Deal priorities, the EU's climate targets for 2030 and 2050, the objectives of the EU biodiversity strategy for 2030, the farm to fork strategy and the vision of a society that acts within environmental and social boundaries as defined in the bioeconomy strategy, the successful proposal will guide and facilitate the green transition towards a circular bioeconomy model, in regions that lag behind in this process.

Projects results are expected to contribute to all following expected outcomes:

- Outline widespread best practices showing the economic, social and environmental opportunities and the challenges of transforming GHG-intensive economies, such as coal mining, intensive agriculture such as livestock or crop production, forestry, and fisheries, and peat production, towards circular bioeconomy model regions;
- Strengthened interactions and coordination between affected European / Associated Countries regions.

Scope:

- Identify just and fair bioeconomy solutions in regions that face difficulties in the green transition to leave no person and no place behind.
- Establish a network structure for European / Associated Countries regions to exchange views, best practices and align their work to overcome common challenges.

[268] 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

- Identify new bioeconomy structures that generate local green growth in regions currently relying on carbon-intensive economic activities that would be utilised by the IA project funded under HORIZON-CL6-2024-CircBio-01-07: Demonstrating the fair and just transition from GHG-intensive economies facing challenges towards circular bioeconomy model regions.
- Provide logistical support to the IA project funded under HORIZON-CL6-2024-CircBio-01-07: Demonstrating the fair and just transition from GHG-intensive economies facing challenges towards circular bioeconomy model regions.
- Social innovation is recommended when the solution is at the socio-technical interface and requires social change, new social practices, social ownership or market uptake.
- Implement the required multi-actor approach by involving a wide diversity of bioeconomy actors and conducting trans-disciplinary research.
- Where relevant, activities should build and expand on the results of past and ongoing research projects.
- 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.

Innovating for blue bioeconomy and biotechnology value chains

Proposals are invited against the following topic(s):

HORIZON-CL6-2023-CircBio-01-11: Novel culturing of aquatic organisms for blue biotechnology applications

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 8.00 million.
Type of Action	Research and Innovation Actions
Technology Readiness Level	Activities are expected to achieve TRL 3-5 by the end of the project – see General Annex B.

Expected Outcome: The selected proposals are expected to contribute to all of the following outcomes:

- Expansion of the potential offered by marine or other aquatic biological resources through advances based on the greater knowledge of the functioning, processes and ecological interactions of marine and other aquatic organisms;

- Development of aquatic biotechnology solutions in cultivation and optimisation of production yield;

- Increased bio discovery of products through sustainable methods for robust aquatic bio-based production, including possibly production of chassis cells, as an alternative to wild harvesting;

- Support to green industrial bioprocessing and more sustainable bio-based products through new biotechnology processes and applications;

- Contribution to the development of circular processing.

Scope: The biotechnological exploitation of both pelagic and benthic marine and other aquatic (such as the ones living in fresh waters, transitional waters and ice ecosystems) organisms often requires their cultivation and the optimisation of production yield for the compounds of interest. Aquatic biota, and in particular marine ones (bacteria, algae, fungi or invertebrates such as sponges, corals and molluscs), cannot be easily cultured. It is believed that just a fraction of 1% of marine bacteria can be cultured using existing methods, and viruses and bacterial and viral phages, present even greater challenges. The culturing of aquatic organisms offers a sustainable alternative to wild harvesting. The potential environmental footprint and impact on health, sustainability and biodiversity aspects need, nevertheless, to be thoroughly assessed and safety established, through risks analysis linked to possible dissemination of newly developed organisms in nature. Culturing methods should be developed in sealed conditions, such completely in vitro or in aquaria and mesocosms, with particular attention to avoid spread of non-indigenous species in the natural aquatic environment.

Proposals under this topic should:

- Develop culturing methods (including for mixed cultures) for vertebrate and invertebrate cell lines for the production of active compounds particularly based on co-metabolism between community members that represent a radical change from the conventional “isolate and enrich” approach to cell culture;

- Develop bio-engineering tools for the use of marine and other aquatic model organisms to improve the availability of metabolites for industrial applications;

- Optimise culturing conditions so that the relevant metabolites are appropriately expressed and can be recovered with selective downstream processing techniques.

Selected projects should collaborate with each other. In this topic the integration of the gender dimension (sex and gender analysis) in research and innovation content is not a mandatory requirement.

Safeguarding and sustainably innovating the multiple functions of EU forests

Proposals are invited against the following topic(s):

HORIZON-CL6-2023-CircBio-01-12: Optimising the sustainable production of wood and non-wood products in small forest properties and development of new forest-based value chains

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	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: the proposals must use the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Beneficiaries may provide financial support to third parties. The support to third parties can only be provided in the form of grants. The maximum amount to be granted to each third party is EUR 60 000.

Expected Outcome: This topic supports the EU forest strategy for 2030 by securing and promoting small-scale forest management for the sustainable use of wood and non-wood products, while fully respecting the cascading use principle and contributing to biodiversity and climate objectives, including forest ecosystem restoration and protection.

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

- Development of regional and local management models for small-scale forest holdings in support of the EU forest strategy for 2030, adapted to the wide variety of contexts found in the EU.
- Better understanding of knowledge, skills, motivation and needs of small-scale forest owners, and development of targeted and innovative approaches for effective support structures and instruments for the various ownership types.

- Contribution to forest-related policy goals of the European Green Deal, including the development of a forest-based bioeconomy, the reduction of greenhouse gas emissions, the increase of carbon removals, the protection of ecosystem services and the restoration and conservation of forest biodiversity.

- Improved guidelines on carbon farming and PES (Payment for Ecosystem Services) design and implementation in Europe formulated and implemented.

- Development of lively, prosperous and resilient rural areas and integration of small-scale forests owners in the bioeconomy value chains.

- Improvement of the quantity and quality of EU forests, their multifunctional role and resilience needs under climate change and contribution to halting and reversing biodiversity loss.

Scope: European forests belong to around 16 million owners, whereby about 60% of the forest area is privately owned, the majority being small properties, often lacking proper attention by their owners mainly due to fragmentation and non-profitability. Knowledge on small-scale private forest owners' expertise, skills, motivations and needs to manage forests sustainably, including both traditional and non-traditional owner types, is limited.

Genuinely trans-disciplinary approaches in research and innovation are needed that combine the environmental and socio-economic dimensions and closely engage with broader stakeholder communities.

This topic addresses sustainable production potentials with a view to securing and promoting small-scale forest management for the sustainable use of wood and non-wood products, while fully respecting the cascading use principle and contributing to biodiversity objectives, including forest ecosystem restoration and protection.

Proposals will:

- Create a better understanding of the circumstances of small forest property owners and behaviour for both traditional and non-traditional owner types.

- Explore, analyse, and develop innovative forest management approaches, including silvicultural practices, carbon farming, digital tools (for example blockchain, robotics, AI or IoT/sensors), organisational, cooperation and business models, advisory services, education and training concepts, policy frameworks and social and institutional models that take into account different ownership types.

- Assess and develop innovative and tailored support structures, programmes and instruments, covering traditional and non-traditional owner types, considering size, geographical, professional and personal backgrounds, value orientations, age, gender, etc.

- Collect, analyse, and develop targeted approaches for activating and mobilising forest owners, particularly non-traditional, non-farm, absentee, urban or women as forest owners taking into consideration existing good practice guidance and examples.
- Define sustainable production potentials for wood and non-wood forest products through improved integrated management approaches.
- Develop new business models to promote the sustainable and value-added utilisation of damaged (burnt, broken, degraded conditions etc.) or infected wood (e.g., by bark-beetle, etc.) within strictly defined ecological thresholds and in line with the cascading use principle, forestry side streams and non-wood forest products (e.g., cork, etc.).
- Contribute positively to the UN and EU sustainability goals (climate, biodiversity, risks, income streams, ecosystem services etc.).
- Explore the role of social, economic, political, and institutional factors to improve political-institutional frameworks on different administrative levels.
- Engage small forest property owner types and all relevant actors in co-creation processes for developing viable measures and tools at local and European scale that contribute to increased awareness and motivation for ensuring sustainable use, restoration, and conservation of resilient small-scale private forest properties.
- Involve rural communities with a view to optimising the mobilisation of forest resources, improving land management practices, and reducing land abandonment in full respect of climate mitigation and adaptation, biodiversity protection and restoration objectives.
- Foster knowledge exchange and capacity-building.

The project must implement the multi-actor approach and ensure an adequate involvement of the primary production sector and the wider forest-based value chain.

Proposals may involve financial support to third parties e.g. to primary producers, academic researchers, start-ups, SMEs, and other multidisciplinary actors, to, for instance, develop, test or validate developed applications. A maximum of € 60 000 per third party might be granted. Conditions for third parties support are set out in Part B of the General Annexes. Consortia need to define the selection process of organisations, for which financial support may be granted. Maximum 20% of the EU funding can be allocated to this purpose. The financial support to third parties can only be provided in the form of grants.

HORIZON-CL6-2023-CircBio-01-13: Capturing market trends and societal perceptions for tailor-made forest services

Specific conditions	
Expected EU contribution per	The Commission estimates that an EU contribution of around EUR 6.00 million would allow these outcomes to be addressed appropriately.

project	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: The following additional eligibility criteria apply: the proposals must use the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.

Expected Outcome: This topic contributes to the new EU forest strategy for 2030 by addressing new opportunities for primary producers to diversify income and employment opportunities and developing new sustainable business models.

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

- Improved integrated management concepts with a focus on market-oriented approaches to meet the growing demand for ecosystem services, including carbon removals through carbon farming.
- Development of decision support and management tools (including digital technologies such as AI, sensors or robotics) that will facilitate the joint delivery of multiple ecosystem services.
- Increased long-term resilience of forest production and use systems and associated value chains.
- Improved guidelines on carbon farming and PES (Payment for Ecosystem Services) design and implementation in Europe formulated and implemented.
- Accelerated uptake of sustainable business models in the primary production sector.

Scope: Forests provide invaluable benefits to people and the planet. They are biodiversity hubs and habitats, vital for climate and water regulation, soil stabilisation and the purification of air and water. Their carbon sequestration and storage capacity make them an important alley in the fight against climate change. Also, forests and the forest-based sector provide multiple socio-economic functions and benefits, including jobs and development possibilities in rural areas. Their role in providing food, medicines and materials and their value for recreation and learning from nature is indispensable for the transition to a circular bioeconomy and a healthy society.

However, there is an increasing demand on European forests to provide a high diversity of goods and ecosystem services at the same time. The choice of forest management can produce different outcomes for ecosystem services and productivity in the short and the long-term.

Forest owners should consider possible trade-offs and synergies with regards to the multifunctional role of forests, their interaction with climate change and their role for biodiversity. Therefore, there is a need for balanced and integrative approaches to ensure ecosystem services in the long-term and to provide sufficient resources for a sustainable and circular bioeconomy, while at the same time, contributing to GHG emissions reductions and carbon removals to contribute to 2030 and 2050 EU climate targets.

This topic addresses new opportunities for primary producers to diversify the income by developing new sustainable business models.

Proposals will:

- Set-up a transdisciplinary forum at the science-policy-society interface to regularly disseminate research results, discuss options for upscaling promising approaches (including technological needs and possible solutions) and collaborate with relevant policy makers, stakeholders and the wider public.

- Explore the evolving societal demands under changing climate conditions for different forest goods and services in an interdisciplinary and integrative approach to improve the knowledge that will help to balance the demands while safeguarding forest's capacities to deliver them in the best possible way.

- Based on previous research results (.e.g., InnoForest[269], Sincere[270], etc.), improve the understanding of ecosystem service interactions at different temporal scales both short-term and long-term and consider relevant social, environmental and economic interdependencies and path dependencies.

- Identify region and national specific market-driven approaches to create new or reactivate value chains and business models based on co-operation between forest owners, policymakers and users of ecosystem services with a view to develop tailor-made solutions and strengthen interdisciplinary and cross-sectoral cooperation.

- Select a set of representative European PES cases, including carbon farming cases, with sufficient implementation length and data availability for a holistic impact evaluation.

- Analyse and compare the data for contextualizing results vis-a-vis the existing literature on PES design and implementation, including carbon farming.

- Improve existing and develop new business models to determine the value and possible funding of sustainable forest management, including through the valuation of ecosystem services such as biodiversity, non-wood products, carbon sequestration and storage, clean water supply, soil protection, recreation, health amenities etc.; and develop standardized methods for their valuation where needed with the goal to maximise sustainable benefit across ecosystem services.

269 https://cordis.europa.eu/project/id/763899.
270 https://cordis.europa.eu/project/id/773702.

- Propose standards for measuring, assessing and valuating ecosystem services in different regional settings, which could lead to more efficient market mechanisms across Europe in support of forest management practices ensuring sustainable use and biodiversity conservation and restoration.

- Promote and provide advice for the set-up of adequate payment schemes through private and public funding instruments at national and EU-level (including the CAP).

The project must implement the multi-actor approach and ensure an adequate involvement of the primary production sector and the wider forest-based value chain.

This topic should involve the effective contribution of SSH disciplines.

HORIZON-CL6-2023-CircBio-01-14: Monitoring the multi-functionality of European forests

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: The following additional eligibility criteria apply: the proposals must use the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part. The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Beneficiaries may provide financial support to third parties. The support to third parties can only be provided in the form of grants. The maximum amount to be granted to each third party is EUR 60 000.

Expected Outcome: This topic supports the implementation of the new EU forest strategy for 2030 by addressing the design of a comprehensive forest information system that align information on forest and soil state, the provision of ecosystem services (including biomass, biodiversity and carbon removals) and socio-economic demands on ecosystem services.

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

- Development of a comprehensive information base for all stakeholders involved in forest matters, from policy making, through forest restoration and conservation planning and funding of such activities, to practical forest management.
- Successful implementation of forest-related policy objectives under the European Green Deal, including the building of a forest-based bioeconomy, the reduction of greenhouse gas emissions, the increase of carbon removals, the contribution to climate change adaptation, the provision of ecosystem services and the conservation and restoration of forest biodiversity.
- Better understanding of the quantity and quality of European forests, their multifunctional role and resilience needs under climate change and contribution to halting the loss of biodiversity.
- Efficient implementation of possible certification schemes in relation to forest multifunctionality (e.g., closer-to-nature forest management practices, carbon farming).

Scope: In the context of climate change impacts, accelerated biodiversity loss and the need to adjust our socio-economic system to a more sustainable alternative, forests play increasingly a double role as victim and part of the solution. While their resilience and potential are under threat, they help to mitigate climate change (e.g., through carbon sequestration), and contribute to climate change adaptation (buffering thermal variations or variations in water flows), harbour large parts of terrestrial biodiversity and provide feasible solutions to support the transition to a bioeconomy.

To adequately manage forests and the services they provide, reliable, up-to-date, and coherent European forest information is more important. However, one of the challenges remain how to integrate information from different sources on the many functions that forests fulfil and the benefits they provide to society. Currently, data are scattered and often focusing on a limited set of indicators, which do not adequately represent the multi-functionality of forests.

This topic addresses the design of a comprehensive forest information system that aligns information on forest state, ecosystem services (including biomass) provision and socio-economic ecosystem services demand.

Proposals will:

- Develop a list of parameters relevant for monitoring of a range of ecosystems services provided by forests.
- Consider the latest scientific knowledge and technology (e.g., through the use of AI, IoT/sensors, robotics and blockchain) for the development, combination, and utilization of reliable data from multiple sources (e.g., national forest inventories, remote sensing, environmental monitoring, large scale societal surveys, national or smaller-scale economic data etc.)

- Assess and propose suitable solutions to make these data available, also by considering issues related to the governance and funding of a fully harmonised monitoring system at EU-level.

- Engage in a structured dialogue with institutions and stakeholders, including the European Commission, national competent authorities, representatives of the forest-sector, as well as data providers to align the needs and possibilities of data collection, provision, and use.

The project must implement the multi-actor approach and ensure an adequate involvement of the primary production sector and the wider forest-based value chain.

Proposals may involve financial support to third parties e.g. to primary producers, academic researchers, start-ups, SMEs, data providers, national administrations, and other multidisciplinary actors, to, for instance, develop, test or validate developed applications. A maximum of € 60 000 per third party might be granted. Conditions for third parties support are set out in Part B of the General Annexes. Consortia need to define the selection process of organisations, for which financial support may be granted. Maximum 20% of the EU funding can be allocated to this purpose. The financial support to third parties can only be provided in the form of grants.

Proposals should build on past or ongoing research projects and collaborate with relevant initiatives, including the Forest Information System for Europe (FISE).

Cross-articulation with the other data spaces, and notably with the European Open Science Cloud should be foreseen, exploiting synergies and complementarities of the different approaches. Efforts should be made to increase the data availability in the appropriate data-infrastructures for further uses.

JRC is available for sharing and taking up results and findings on the monitoring of the forest ecosystem multifunctionality in the EU Observatory for Deforestation, Forest Degradation and Associated Drivers and JRC Big Data Analytics Platform.

In this topic the integration of the gender dimension (sex and gender analysis) in research and innovation content is not a mandatory requirement.

Call - Circular economy and bioeconomy sectors

HORIZON-CL6-2023-CIRCBIO-02

Conditions for the Call

Indicative budget(s)[271]

[271] 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)	Expected EU contribution per project (EUR million)[272]	Indicative number of projects expected to be funded
		2023		
Opening: 22 Dec 2022 Deadline(s): 28 Mar 2023 (First Stage), 26 Sep 2023 (Second Stage)				
HORIZON-CL6-2023-CircBio-02-1-two-stage	IA	58.00	9.00 to 10.00	6
HORIZON-CL6-2023-CircBio-02-2-two-stage	IA	14.00	Around 7.00	2
HORIZON-CL6-2023-CircBio-02-3-two-stage	RIA	8.00	Around 4.00	2
Overall indicative budget		80.00		

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.

[272] The budget amounts are subject to the availability of the appropriations provided for in the general budget of the Union for years 2023 and 2024.
Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

Enabling a circular economy transition

Proposals are invited against the following topic(s):

HORIZON-CL6-2023-CircBio-02-1-two-stage: Circular Cities and Regions Initiative (CCRI)'s circular systemic solutions

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of between EUR 9.00 and 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 58.00 million.
Type of Action	Innovation Actions
Admissibility conditions	The conditions are described in General Annex A. The following exceptions apply: Applicants submitting a proposal under the blind evaluation pilot (see General Annex F) must not disclose their organisation names, acronyms, logos, nor names of personnel in 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 following exceptions to the conditions described in General Annex B apply: Proposals funded under this topic, and their circular systemic solutions, must form part of the demonstration projects for the implementation of the European Commission's Circular Cities and Regions Initiative (CCRI). This means: (i) that proposals must cooperate with CCRI and its Coordination and Support Office by means of sharing with this initiative knowledge and experiences developed during the implementation and demonstration of the circular systemic solutions; (ii) proposals must participate in the CCRI's events. Applicants must integrate explicitly these obligations into their proposal's work plan.
Technology Readiness Level	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B.
Procedure	The procedure is described in General Annex F. The following exceptions apply:

	This topic is part of the blind evaluation pilot under which first stage proposals will be evaluated blindly.

Expected Outcome: Successful proposals will support the delivery of solutions to implement the European Green Deal, the EU circular economy action plan (CEAP) and the bioeconomy strategy. The topic will support the transition towards a sustainable, regenerative, inclusive and just circular economy at local and regional scale across regions of Europe, boosting interregional and cross border cooperation.

Proposals funded under this topic will form part of the demonstration projects for the implementation of the European Commission's Circular Cities and Regions Initiative (CCRI)[273]. Proposals are expected to provide policymakers, public and private investors and local communities with concrete and demonstrated examples of circular systemic solutions.

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

- Significantly increased circularity, reduced GHG emissions, and where relevant increased carbon removals, in product value chains, and efficient valorisation of local resources in cities, regions or their groupings.
- Creation of business opportunities and jobs in the circular economy at urban and/or regional scale.
- Increased uptake and participation of citizens in circular and climate-neutral practices.
- Enhanced knowledge transfer between the cities, regions or their groupings involved in the proposals financed under this topic and other cities and regions in EU Member States and Associated Countries.
- More effective widespread uptake and easier replication, scalability and visibility of circular systemic solutions and hence multiplication of their economic, social and environmental benefits.
- Contribution to achieving the policy targets of the European Green Deal, circular economy action plan, EU bioeconomy strategy and the European industrial strategy at local, regional, national, European and international levels.

Scope: In the context of this topic, a circular systemic solution is defined as demonstration project for deploying a circular and climate-neutral economy at urban and/or regional scale, involving key stakeholders and, ideally, addressing more than one product value chain. Proposals are expected to implement and demonstrate at large scale circular systemic solutions for the deployment of the circular economy (including the circular bioeconomy) in cities and regions or their groupings. They should form part of the implementation of the European Commission's Circular Cities and Regions Initiative (CCRI) and they should be

273 https://ec.europa.eu/info/research-and-innovation/research-area/environment/circular-economy/circular-cities-and-regions-initiative_en .

carried out in close coordination and cooperation with the CCRI Coordination and Support Office (CCRI-CSO).

The implemented circular systemic solutions should address economic, social and environmental dimensions of the transition towards a circular economy and include science, technology and governance components. They should demonstrate circular innovative technologies, novel governance and business models and support the active participation of all relevant actors in cities, regions or their groupings. Examples of relevant actors are: public administrations (national/regional/local authorities) and utilities (public/private companies); private sector services and industries, including start-ups and small and medium enterprises (SMEs); research infrastructures, scientific and innovator communities including incubators and accelerators; financial intermediaries with a focus on environmental and social impact; venture capitalists and business angels; civil society, including citizens; and non-governmental organisations and philanthropy.

The implemented circular systemic solutions can address ideally more than one of the key product value chains set out in the new circular economy action plan, i.e.: batteries and vehicles, electronics and ICT, packaging, plastics, textiles, construction and buildings, food, water and nutrients. [274] The circular systemic solutions may also include nature-based solutions. Circular systemic solutions and the economic sectors involved in them should be selected and based on a detailed analysis of the cities, regions or their grouping's socio-economic and environmental needs to be addressed, circular potential to be exploited and challenges to be tackled.

Circular systemic solutions should identify, analyse and, when feasible, quantify the economic, social and environmental benefits and trade-offs/challenges related to their implementation and demonstration. They should include the monitoring and evaluation of the transition towards a circular economy, identify their strengths and weaknesses as well as causes. They should analyse the encountered regulatory obstacles and drivers and provide clear and precise policy recommendations to improve circular economy. Each circular systemic solution should address environmental externalities and contribute to preserving and, where possible, increasing the well-being and the health conditions of the local communities involved in the transition towards a circular economy.

It is crucial that the circular systemic solutions implemented and their business models have a high replicability and scalability potential. This is fundamental to facilitate that circular systemic solutions demonstrated in specific areas should be replicated in others. During their implementation and by the end of their life cycle, the selected proposals are expected to share with all stakeholders clear and comprehensive guidelines on the circular systemic solutions adopted, including their strengths and challenges. They should also provide information on key barriers identified to avoid their emergence at early stages of replicating existing solutions. Proposals should ensure that all evidence, information and project outcomes will be accessible through the CCRI website (incl. business models and other studies).

274 https://ec.europa.eu/environment/circular-economy/.

It is essential that proposals also ensure complementarity and cooperation with existing and future relevant European projects on the circular economy and the circular bioeconomy, with special reference to those on local and regional scale and avoid overlaps and repetition[275].

Citizen science could be appropriate mode of research to increased practices and participation of citizens in circular systemic solutions.

Where relevant, SSH and social innovation aspects should be considered.

HORIZON-CL6-2023-CircBio-02-2-two-stage: Novel, sustainable and circular bio-based textiles

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
Admissibility conditions	The conditions are described in General Annex A. The following exceptions apply: Applicants submitting a proposal under the blind evaluation pilot (see General Annex F) must not disclose their organisation names, acronyms, logos, nor names of personnel in Part B of their first stage application (see General Annex E).
Technology Readiness Level	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B.
Procedure	The procedure is described in General Annex F. The following exceptions apply: This topic is part of the blind evaluation pilot under which first stage proposals will be evaluated blindly.

Expected Outcome: A successful proposal will contribute to expected impacts under the Destination 'Circular economy and bioeconomy sectors', in line with the European Green Deal, the EU bioeconomy strategy and its action plan, the EU biodiversity strategy for 2030, the circular economy action plan (CEAP), the chemicals strategy for sustainability, the EU

[275] Such as, projects under the Horizon Europe topic HORIZON-CL6-2021-CIRCBIO-01-01: Circular Cities and Regions Initiative (CCRI)'s circular systemic solutions, and Horizon 2020 European Green Deal call's topic LC-GD-3-2-2020: Demonstration of systemic solutions for the territorial deployment of the circular economy.

textiles strategy, the EU zero pollution action plan as well as the New European Bauhaus initiative and the EU industrial strategy.

In particular, expected impacts to be addressed by successful proposals include: i) enhancing European industrial sustainability, competitiveness and resource independence; ii) accelerating regional, rural, local, urban and consumer-based transitions towards a sustainable, regenerative, inclusive, just and clean circular economy and bioeconomy as well as iii) the development of innovative and sustainable value-chains in the bio-based sectors, substituting fossil-based ones.

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

- Significantly reduce the negative environmental impact of textiles throughout their lifecycle. This impact encompasses primary raw materials and water consumption, land use and indirect land use change, as well as GHGs and other pollutants emissions (zero pollution), via addressing circularity-by-design and sustainable production aspects (the latter including thus also resource efficiency and circularity of resources improvements).

- Significantly increase recyclability and circularity of textiles; it is estimated that currently there is a very low rate of recyclability of textiles into new textiles, worldwide[276].

- Increase the use of EU (locally/regionally-sourced) alternative, bio-based fibres (including the reuse of bio-based textiles in their present form and in novel forms of use).

- Address social impacts (e.g., HS&E and working conditions), in addition to environmental effects; projects should ensure sustainable, circular and socially just textile production and consumption at EU level, while international cooperation is strongly encouraged. The latter will allow for enhancing further on the sustainable production and consumption of textiles while improving on the replication potential of the proposed innovations.

- Empower and increase SMEs participation and improve academia/industry/feedstock &fibres suppliers' interactions and collaboration.

- Establish new and innovative circular bio-based value chains with a positive impact on EU competitiveness and jobs creation at regional, rural and local levels.

Scope: Overall, the call addresses the design, demonstration and scale-up of production of sustainable and circular, bio-based textiles for one or more applications: e.g., technical textiles, garments, industrial textiles, home textiles; including also innovative smart textiles and those providing additional functionalities (e.g., antimicrobial or fire resistance properties). Blended, but only bio-based compositions, are included hereby.

More specifically, the overall scope should be addressed by the projects via:

[276] See EU Strategy for textiles.

- Valorisation of secondary biomass, residues and under-utilised (primary or secondary) biomass (sustainable biomass sourcing, land use, land-use change and forestry (LULUCF) and biodiversity considerations should be addressed/showcased) for bio-based textiles. Moreover, the reuse of fibres from bio-based textiles to produce circular bio-based textiles is in scope;

- Design for circularity, enabling thus material design for durability, end-of-life recyclability, re-use and upcycling (including usability of waste fibres), with attention to the final application(s)/end use of textiles;

- Design for end-product quality, safety, and durability, with consideration of the sustainability and circularity of textiles value chains and the final application/end-use; this does include preventing micro- and nano- plastics/fibres release throughout the lifecycle of textiles;

- Development, demonstration and scale-up of novel processes by deploying appropriate enabling technologies[277] to significantly reduce the environmental footprint of textiles, across their production steps (pre-treatment, mordanting, dyeing, and finishing steps), improving notably on climate neutrality and against zero pollution. Moreover, apply industrial, industrial-urban and other symbiosis concepts, where necessary to achieve and enhance targeted outcomes and impacts;

- Assess the environmental and social sustainability performance of the proposed innovations (textiles production and textiles lifecycle), while including technoeconomic feasibility assessment as well. The methodologies of assessment should follow existing EU standards;

- Integrate the Safe-and-Sustainable-by-Design (SSbD) framework, developed by the Commission, for assessing the safety and sustainability of chemicals and materials.[278] Contribute with and develop recommendations that can advance further the application of the SSbD framework. More specifically, provide thresholds that can support the criteria definition and improvements for the assessment SSbD methodologies, including any specificities related with bio-based textiles. Recommendations can also include identification of data gaps, especially safety, environmental, but also socio-economic factors, as well as priorities for data collection.

- Address, consumer behaviour, acceptance and demand aspects for circular and sustainable bio-based textiles;

- Assess existing barriers to implementing circular economy business models for textiles; on this basis create innovative, sustainable and circular business models for the (EU and

[277] Including deploying enabling technologies e.g. industrial biotechnology, enabling digital technologies etc. (examples are non-exhaustive).

[278] See documents defining the SSbD framework and criteria on: https://research-and-innovation.ec.europa.eu/research-area/industry/key-enabling-technologies/advanced-materials-and-chemicals_en.

local) production and consumption of circular bio-based textiles. The participation of industry and particularly SMEs is strongly encouraged.

Projects are also expected to contribute to the New European Bauhaus (NEB) initiative by interacting with the NEB Community, NEB Lab and other relevant actions of the NEB initiative through sharing information, best practice, and, where relevant, results.

Where relevant, proposals should seek links with and capitalise on the results of past and ongoing EU funded research projects, (Horizon 2020, LIFE, Horizon Europe) including the ones under the Circular Bio-based Europe JU (CBE JU) and other partnerships of Horizon Europe.[279,280]

Proposals should also include a dedicated task, appropriate resources and a plan on how they will collaborate with other projects funded under this topic and other relevant topics.

Social Science and Humanities (SSH), social innovation and international cooperation aspects are also applicable to this topic and it is highly encouraged to address them as cross-cutting issues.

Innovating for sustainable bio-based systems, biotechnology and the bioeconomy

Proposals are invited against the following topic(s):

HORIZON-CL6-2023-CircBio-02-3-two-stage: Non-plant biomass feedstock for industrial applications: technologies and processes to convert non-lignocellulosic biomass and waste into bio-based chemicals, materials and products, improving the cascading valorisation of biomass

Specific conditions	
Expected EU contribution per	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately.

279 E.g., see Horizon 2020, CE-FNR-14-2020 call: Innovative textiles – reinventing fashion - IA (projects HEREWEAR, MY-FI and New Cotton), as relevant. HEREWEAR: Bio-based local sustainable circular wear (ID: 101000632); MY-FI: Reinventing a smart, circular and competitive textile industry with advanced myco-fibres (ID: 101000719); New Cotton: Demonstration and launch of high performance, biodegradable, regenerated new Cotton textiles to consumer markets through an innovative, circular supply chain using Infinited Fiber technology (ID: 101000559). Also BBI JU past and ongoing projects: GRETE H2020-BBI-JTI-2018- 'Green chemicals and technologies for the wood-to-textile value chain', GLAUKOS H2020-BBI-JTI-2019- 'Sustainable clothing and fishing gear'. NEOCEL H2020-BBI-JTI-2015 'Novel processes for sustainable cellulose-based materials', EFFECTIVE H2020-BBI-JTI-2017 'Advanced Eco-designed Fibres and Films for large consumer products from biobased polyamides and polyesters in a Circular Economy perspective', UNLOCK H2020-BBI-JTI-2020 Unlocking a feather bioeconomy for keratin-based agricultural products, AllThingsBio H2020-BBI-JTI-2019 (for the fashion and textile aspects – consumers awareness and participation).

280 See also: HORIZON-CL6-2024-CIRCBIO-01-2: 'Circular solutions for textile value chains based on extended producer responsibility', HORIZON-CL6-2024-CIRCBIO-02-1-two-stage: 'Circular solutions for textile value chains through innovative sorting, recycling, and design for recycling' and HORIZON-CL6-2023-ZEROPOLLUTION-02-2-two-stage: 'Safe-and-sustainable-by-design bio-based platform chemicals, additives, materials or products as alternatives'.

project	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	Research and Innovation Actions
Admissibility conditions	The conditions are described in General Annex A. The following exceptions apply: Applicants submitting a proposal under the blind evaluation pilot (see General Annex F) must not disclose their organisation names, acronyms, logos, nor names of personnel in Part B of their first stage application (see General Annex E).
Technology Readiness Level	Activities are expected to achieve TRL 5 by the end of the project – see General Annex B.
Procedure	The procedure is described in General Annex F. The following exceptions apply: This topic is part of the blind evaluation pilot under which first stage proposals will be evaluated blindly.

Expected Outcome: A successful proposal will contribute to expected impacts under Destination 'Circular economy and bioeconomy sectors', related to consumers and industry, and in line with: the European Green Deal, the circular economy action plan, EU biodiversity strategy for 2030, the EU bioeconomy strategy & its action plan, the Waste Framework Directive and the EU industrial strategy.

In particular, expected impacts to be addressed by successful proposals include: i) developing innovative and sustainable value-chains in the bio-based sectors and ii) enhancing European industrial sustainability, competitiveness and resource independence.

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

- Increased sustainability of biomass resources valorised in industrial applications, lowering land dependence and Indirect Land Use Change (ILUC) impacts, protecting biodiversity and respecting ecosystems integrity;

- Contribution to climate-neutrality (primarily via reduction of greenhouse gas emissions, and accessorily via increase of carbon removals),[281] zero pollution and resource efficiency via practical application of the circular (bio)economy concept;

- Improved industrial competitiveness, strategic autonomy and resource independence of bio-based value chains of EU Member States and/or Associated Countries, due to more sustainable industrial products and practices.

[281] Sustainable Carbon Cycles communication.

- Environmental, economic and social benefits on territorial and municipal level, due to increased circularity and upcycling of low-value, Non-Lignocellulosic Biomass (NLBM) (waste), of terrestrial or aquatic origin, including its upcycling into high-value applications.

- SMEs engagement, including the regional dimension, for skilled jobs creation.

- Increased cooperation and awareness across circular bio-based value chains, including waste managers, biomass feedstock providers, bio-based (process) industry, end-users and the civil society.

Scope: Circular bioeconomy will rely on the availability of diversified and low/no-ILUC (Indirect Land Use Change) sources of biomass but also on the ability to design, develop and scale-up processes to valorise such feedstock towards high-value, sustainable bio-based products. Non-Lignocellulosic Biomass (NLBM),[282] and related residual non-lignocellulosic biomass', provide options beyond plant biomass. However, NLBM from aquatic and terrestrial sources, often face challenges to reach economies of scale and biorefining production intensification, driven also by a complex and varying feedstock composition.

Project activities should address:

- Identification and optimization of suitable NLBM feedstock, with focus on higher resources efficiency and circularity, while respecting the waste hierarchy principles. Such feedstock to be deployed in adequate production systems, including upcycling approaches. More specifically, design and develop innovative upstream and conversion processes at pilot scale (e.g., via application of enzymes, industrial microbial hosts, microbiomes from natural ecosystems and diverse industrial biotech or other appropriate enabling technologies);

- Develop downstream conversion processes, building towards a targeted portfolio of high-value bio-based process outputs / bio-based products that can be later obtained in NLBM integrated biorefineries (of appropriate scale);

- Assessment of the proposed/developed innovative processes against techno-economic feasibility to valorise NLBM (waste) (at different potential biorefinery scales), showcasing/ensuring process flexibility to cope with the composition heterogeneity of the chosen NLBM feedstock(s);

[282] For non-lignocellulosic (NLBM), non-plant biomass & NLBM waste in scope, main examples include: Agri-food residues and waste (incl. food waste), marine and aquaculture residues and waste chitinous biomass; municipal solid waste (organic fraction); livestock waste by-products (such as feathers and bones).
Note 1: For waste or mixed feedstock (e.g. food waste) where lignocellulose can be a minor/small fraction, this can be in scope. Note 2: micro- and macro-algae are excluded, as this type of feedstock is dealt under Destination 3 - Heading 3: 'Innovating for blue bioeconomy and biotechnology value chains'. Manure and sewage sludge are also out of scope of this topic (please see Destination – Clean environment and zero pollution, Destination – Fair, healthy and environment-friendly food systems from primary production to consumption and Destination – Clean environment and zero pollution).

- Application of ex ante life-cycle assessment methodologies to ensure gains in environmental performance (including biodiversity), but also socio-economic aspects, as well ensuring safety for the consumers and operators;

- Enable participatory approaches and knowledge sharing across circular bio-based value chains. This includes feedstock providers (rural, coastal, urban and peri-urban dimensions, as appropriate), bio-based (process) industry, end-users and the civil society, aiming for a comprehensive scoping of challenges (multiple dimensions) and opportunities of valorising NLBM and NLBM waste.

- Production of biofuels and bioenergy, as the main production focus, falls outside the scope of this topic (their co-production, while following the cascading biomass use principles, is not excluded though). Food/feed ingredients, cosmetics-related compounds and especially those with health-promoting properties (nutraceuticals), may be in scope, provided their toxicological and nutritional safety has been assessed and guaranteed at EU level.

Where relevant, proposals should seek links and synergies as well as capitalise on the results of past and ongoing EU research projects under Horizon 2020, LIFE and Horizon Europe (especially under the Bio-based Industries Joint Undertaking (BBI JU) / Circular Bio-based Europe Joint Undertaking (CBE JU))[283].

Proposals should also include a dedicated task, appropriate resources and a plan on how they will collaborate with other projects funded under this topic and other relevant topics.

Social sciences and humanities (SSH) and social innovation aspects should be considered for this topic.

Call - Circular economy and bioeconomy sectors

HORIZON-CL6-2024-CIRCBIO-01

Conditions for the Call

Indicative budget(s)[284]

Topics	Type of	Budgets (EUR	Expected EU contribution per	Indicative number

[283] See also complementary topic HORIZON-CL6-2023-CIRCBIO-01-4: 'Land-based bioprospecting and production of the bioactive compounds and functional materials for multiple bio-based value chains' and also HORIZON-CL6-2023-CIRCBIO-01-05: Broadening the spectrum of robust enzymes and microbial hosts in industrial biotechnology.

[284] 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 years 2023 and 2024.

	Action	million) 2024	project (EUR million)[285]	of projects expected to be funded
Opening: 17 Oct 2023 Deadline(s): 22 Feb 2024				
HORIZON-CL6-2024-CircBio-01-1	CSA	6.00	Around 6.00	1
HORIZON-CL6-2024-CircBio-01-10	RIA	9.00	Around 4.50	2
HORIZON-CL6-2024-CircBio-01-2	IA	14.00	Around 7.00	2
HORIZON-CL6-2024-CircBio-01-3	IA	10.00	Around 5.00	2
HORIZON-CL6-2024-CircBio-01-4	IA	10.00	Around 5.00	2
HORIZON-CL6-2024-CircBio-01-5	RIA	8.00	Around 4.00	2
HORIZON-CL6-2024-CircBio-01-6	RIA	6.00	Around 3.00	2
HORIZON-CL6-2024-CircBio-01-7	IA	6.00	Around 6.00	1
HORIZON-CL6-2024-CircBio-01-8	CSA	3.00	Around 3.00	1
HORIZON-CL6-2024-CircBio-01-9	CSA	2.50	Around 0.80	3
Overall indicative budget		74.50		

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

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

	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.

Enabling a circular economy transition

Proposals are invited against the following topic(s):

HORIZON-CL6-2024-CircBio-01-1: Circular Cities and Regions Initiative's project development assistance (CCRI-PDA)

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: The following additional eligibility criteria apply: Proposals funded under this topic, and their circular systemic solutions, must form part of the demonstration projects for the implementation of the European Commission's Circular Cities and Regions Initiative (CCRI). This means that: • Proposals must cooperate with CCRI and its Coordination and Support Office by means of sharing with this initiative knowledge and experiences developed during the implementation of the project; these must be included in the Work Plan; • Proposals must participate in the CCRI's events; these must be included in the Work Plan; Applicants must integrate explicitly these obligations into their proposal's work plan.
Legal and	The rules are described in General Annex G. The following exceptions

financial set-up of the Grant Agreements	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). [286].

Expected Outcome: The successful proposal will support the delivery of solutions to implement the European Green Deal, the circular economy action plan (CEAP) and the bioeconomy strategy. The topic will support the transition towards a sustainable, regenerative, inclusive and just circular economy across regions of Europe at local and regional scale.

The Circular Cities and Regions Initiative's Project Development Assistance (CCRI-PDA) projects are part of the implementation of the European Commission's Circular Cities and Regions Initiative (CCRI)[287]. They will be carried out in close coordination and cooperation with the CCRI Coordination and Support Office (CCRI-CSO).

Investors and lenders need to gain more confidence in investment projects in the field of circular economy which are still seen as risky. European added value can be achieved, for example, where projects introduce innovation to the market regarding financing solutions minimising transaction costs and engaging the private finance community. European added value could also be achieved where projects demonstrably address legal, administrative and other market opportunities and challenges for innovative and sustainable circular economy investment schemes.

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

- Delivery of a series of sustainable circular economy projects;
- Roll-out of innovative financing solutions/schemes at local and regional scale across Europe.

Scope: The CCRI-PDA service targets public and private project promoters such as local and regional authorities or their groupings, public/private infrastructure operators and bodies, utilities and services, industry (including SMEs).

The purpose of the CCRI-PDA is to help project promoters develop their circular economy proposals at local and regional scale by bringing together the technical, economic and legal expertise.

---

286 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

287 https://ec.europa.eu/info/research-and-innovation/research-area/environment/circular-economy/circular-cities-and-regions-initiative_en

The CCRI-PDA should provide support for those activities necessary to prepare and mobilise finance for investment projects, such as feasibility studies, stakeholder and community mobilisation, business plans and preparation for tendering procedures or setting up a specific financing scheme/financial engineering.

The CCRI-PDA should focus on activities aimed at increasing circularity in product value chains that are relevant for the transition towards a sustainable circular economy at local and/or regional scale. The economic sectors and investment proposals involved in each CCRI-PDA service should be clearly specified and selected according to local and/or regional circular economy needs, resources and potential. This selection should be clearly justified and explained.

Ideally, the proposed investments should be launched before the end of the project, which means that proposals should result in signed contracts with investors for circular economy investments at local and regional scale to that effect. Furthermore, the proposals should provide tangible showcases that trigger further market replication.

In addition, proposals should also include an exemplary/showcase to increase circularity in specific sector(s) at local and regional scale and/or in the size of the expected investments and leverage factors[288];

In addition, all proposals should demonstrate a high degree of replicability and include a clear action plan to communicate experiences and results to potential replicators across EU Member States and Associated Countries.

Indicatively, the CCRI-PDA focuses on small and medium-sized circular economy investments of up to EUR 20 million[289] (for a single proposal or a portfolio of proposals).

The EU contribution per proposal should not exceed 10% of the related investment.

Proposals should justify the budget for the project development assistance needed based on the expected investment portfolio to be set up. This includes the amount of investments that is expected to be triggered and the respective leverage factors to be achieved.

Proposals are expected to ensure synergies and complementarities with other EU financial schemes for circular economy projects. Proposals should ensure that all evidence, information and project outcomes will be accessible through the CCRI website (incl. business models and other studies).

In this topic the integration of the gender dimension (sex and gender analysis) in research and innovation content is not a mandatory requirement.

---

288 i.e. amount of investments in the circular economy triggered per each EUR of Horizon Europe support.

289 The Circular Economy Technical Assistance Facility (CETAF) will focus on projects and programmes with a minimum total investment volume of EUR 20 million.

HORIZON-CL6-2024-CircBio-01-2: Circular solutions for textile value chains based on extended producer responsibility

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
Technology Readiness Level	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B.

Expected Outcome: A successful proposal will contribute to the following Destination impacts: i) enhance European industrial sustainability, competitiveness and resource independence, and ii) improve on consumer and citizen benefits.

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

- Recommendations on best innovative solutions for the identification of material composition of used textiles/textile waste embedded in the design of textile products;
- Recommendations on design for recycling for textile products that allows the use of targeted Extended Producer Responsibility (EPR) schemes;
- Recommendations on policy tools to reach EU greenhouse gas reduction targets till 2050 (climate neutrality), including the 2030 target.

Scope: Textiles are the fourth highest-pressure category for the use of primary raw materials and water and fifth for greenhouse gas emissions and a major source of microplastic pollution in production and use phases. They are also a key material and product stream in the circular economy action plan. Improvements in the circularity of the textile value chains will help reduce GHG emissions and environmental pressure. EPR schemes are a lever for circularity. The purpose of this topic is to enable the optimal functioning of EPR schemes for textiles within the EU and to take into account the commitments of the textile strategy on EPR. The circular economy action plan establishes the policy objective to make the textiles sector more sustainable by boosting the circularity of textile consumption i.a. through reuse, separate collection, sorting and recycling of textiles. It also wants to limit textile waste generation and restrict exports of waste that have harmful environmental and health impacts in third countries or that can be treated within the EU. Furthermore, increased amounts of separately collected textile waste are expected because of the Waste Framework Directive's obligation to separately collect textiles as of 2025.

Extended Producer Responsibility (EPR) schemes have proven to be an effective tool for improving the treatment of other waste streams and therefore are being considered as necessary in recent consultations by the stakeholders of the textile sector. In view of that, the Commission is assessing the feasibility of introducing EPR for textiles into EU legislation. Proposals should aim to support the high-quality separate collection, preparation for treatment and treatment of used textiles and textile waste, thereby enabling the optimal functioning of EPR schemes in this sector. It will do so by providing recommendations on improving the ease of identification of material composition in a wide range of used textile products/waste to inform the different actors in the use and end-of-life stages of textiles (consumers for use and disposal, social enterprises to enable reuse, waste management operators to enable preliminary treatment and treatment operations). To do so, it will inter alia identify, develop and test innovative labelling of textile products (including through the use of technologies such as AI, blockchain or Internet of Things) to ease separate collection for re-use or end-of-life treatment that leads to high quality secondary raw materials.

Proposals should bring together different stakeholders active in the sector along the value chain, such as waste collectors, waste sorters, repair and reuse organisations. Proposals should also try to address historical liabilities and the impact of textiles coming from outside the EU. Proposals should analyse how EPR schemes can improve the circularity of textiles, assess the material composition in a wide range of used textile products and waste with a view to targeted EPR schemes for improved collection and recycling, and test separate collection options for reuse or end-of-life treatment that could be enforced through EPR schemes. Projects should also identify novel solutions for textile reuse. They should also consider possible rebound effects and only propose measures that will not hamper the market uptake of more sustainable novel textile materials. Projects should also recommend/identify/define tools (policy, legislation, governance, market-based, etc.) that the EU institutions (Commission, Parliament, Council of the EU) could implement or propose in order to reduce the overall greenhouse gas (GHG) emissions from the textile sector (including from final consumption, not only production) in the EU in line with the EU greenhouse gas emissions reduction targets till 2050 (climate neutrality), including the 2030 target; for this, the projects should take into account the relevant possible rebound effect.

The targeted TRL at the end of the projects is 6 to 8.

HORIZON-CL6-2024-CircBio-01-3: Innovative circular solutions for furniture

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
Technology Readiness Level	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B.

Expected Outcome: A successful proposal will contribute to the following Destination impacts: i) enhance European industrial sustainability, competitiveness and resource independence, and ii) improve on consumer and citizen benefits.

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

- Increased deployment and demonstrated benefits of advanced digital solutions (e.g., through AI, robotics, IoT, blockchain) in circular businesses including waste management and recycling
- Emergence of new value chains using upcycled, recycled and/or biobased;
- resources, e.g. through industrial symbiosis, with particular attention to SMEs;
- Increased recycling rates and upcycling to new higher-value products;
- Increased uptake of recycled and/or renewable material;
- Increased deployment and market uptake of circular design, including design for easy maintenance, repair, remanufacturing and recycling;
- Increased reuse, refurbishment and remanufacturing rates and diffusion of new circular business practices, in particular in the uptake of repair, reuse, refurbishment and remanufacturing;
- Increased resource efficiency along and across value chains, causing a measurable reduction in GHG emissions, release of microplastics, other environmental pollution, and in the use of hazardous substances, and an increase of carbon removals.

Scope: Predominantly consisting of SMEs, the EU furniture industry employs around one million European workers and manufactures approximately a quarter of the world's furniture, representing a EUR 84 billion market equating to an EU28 consumption of ~10.5 million tons of furniture per annum. Despite a notable degree of knowledge and awareness of CE principles, analyses conducted in the framework of luxury furniture show that the involvement of furniture companies in CE practices, in particular those concerning reuse and recycle actions, is still marginal, and very limited use of process and product certifications has been noted.179 According to the findings of an EU-funded project180, furniture waste in the EU accounts for more than 4% of the total municipal solid waste stream. Waste arising from commercial sources is assumed to contribute 18% of total furniture waste generation across the sector. Total annual EU furniture waste equates to 10.78 million tonnes. According to European Federation of Furniture Manufacturers statistics, 80% to 90% of the EU furniture waste in MSW is incinerated or sent to landfill, with ~10% recycled. Reuse activity in the

sector is considered low. Where reuse does occur, it is mostly through commercial second-hand shops, social enterprise companies or charities.

Six key cycles can be highlighted to make furniture more circular. All proposals should target several of these cycles:

- Maintain – using preventative maintenance to maximise product lifetime, e.g., a chair remains a chair;
- Repair – corrective maintenance, e.g., a chair remains a chair;
- Reuse – redistributing products through a change in ownership, e.g., a chair remains a chair;
- Refurbish or remanufacture products to optimize lifetime, e.g., by resizing a desk or changing the appearance of a chair through re-upholstering to extend 'fashion' service life, or resizing desks;
- Repurpose – change functionality of the product, e.g., a desk becomes a table;
- Recycle – recovering the value of components and materials for feedstock as secondary materials in new products.

Key strategies to achieve the circularity transition are circular design including the smart use of biobased materials, a shift from products to services, extended product life through design, safe and circular material choices, increased material efficiency, and modular design. It is evident that circularity concepts must be anchored in the design phase of products and aim at the user. All proposals should therefore address to some extent circular design strategies.

Projects should demonstrate and deploy at large scale innovative solutions and designs for increased quality, non-toxicity and durability of secondary and renewable materials and increased share of secondary and renewable materials in new products. Projects should demonstrate increased recovery, recycling and upcycling rates and a higher uptake of secondary materials for high value applications. Projects should also demonstrate circular business practices, in particular in the uptake of repair and reuse, remanufacture, product-service-systems, and in the full lifetime of products or services. To achieve this, targeted market size, economic feasibility, cost efficiency and social acceptance need to be addressed. To break down the barriers for this transition, it is important that proposals involve and address the different perspectives of all relevant actors, e.g., manufacturers, retailers, consumers and Civil Society Organisations (CSOs). Proposals should consider the use of digital solutions (including technologies such as AI, robotics, IoT and blockchain) in particular with a view to the implementation of the digital product passport, and demonstrate their benefits for increased circularity. They should also help produce harmonised and robust methods to assess the amount of recycled content in sectoral products, which is key for a future review of green claims through authorities and consumer organisations. Environmental, social and economic impacts should be assessed from a lifecycle perspective as product, organisation and consumption environmental footprints, using the respective methods

developed by the European Commission (Product Environmental Footprint, PEF, should be used for the assessment of the environmental impacts) and through costing methods and a dynamic LCA; relevant data should be fed into the European Platform on Life Cycle Assessment, following the specific Environmental Footprint data and format requirements. The functional performance of technologies and secondary materials can be assessed through the EU Environmental Technology Verification (ETV) scheme. Considering the microplastics and microfiber pollution and hazardous substances that are present in the targeted waste streams, their removal from the materials used for the products in concern as well as from the recovered material is crucial, in addition to applying less-polluting production and consumption procedures. Decontamination levels need to be properly addressed and accumulation prevented. Proposals should fully incorporate the Safe and Sustainable by Design (SSbD) approach. All results should be validated using quantitative indicators and targets wherever possible.

Proposals should also envisage policy recommendations for increased warranty and cascading use. They should also provide for the development of training material to endow workers in this occupational group with the right skillset in order to deploy the new technologies developed. Proposals should consider the development of learning resources for the current and future generations of employees, with the possibility to integrate them in existing curricula and modules for undergraduate level and lifelong learning programmes. The projects should provide contributions to relevant standards or best practices.

Social innovation is recommended when the solution is at the socio-technical interface and requires social change, new social practices, social ownership or market uptake.

To the extent that proposed solutions will address the role of the consumer, proposals should seek to contribute to the goals and cooperate with the services of the European Commission's Circular Cities and Regions Initiative (CCRI). Joint activities with CCRI projects are encouraged.

The targeted TRL at the end of the projects is 6 to 8.

HORIZON-CL6-2024-CircBio-01-4: Systemic circular solutions for a sustainable tourism

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

Expected Outcome: A successful proposal will contribute to the following Destination impacts: i) accelerate regional, rural, local/urban and consumer-based transitions, ii) enhance European industrial sustainability, competitiveness and resource independence, and iii) improve on consumer and citizen benefits.

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

- Diffusion of circular tourism services, where the use of harmful substances and the generation of waste is minimised and the use of energy, land and water is efficient;
- Deployment of replicable systemic solutions for cities and regions, where circularity is ingrained in the service design, whether for the use of residents or visitors, taking into account the specific needs of the territory (urban, rural, peripheral);
- Increased circular, zero-pollution and climate-neutral practices among providers and users of tourism services and active participation of users in circular systemic solutions;
- Deployment of innovative solutions and new, affordable technologies (including digital technologies such as AI, robotics, IoT and blockchain) that support transformation towards circularity for all actors on different systemic levels;
- Creation of jobs that facilitate circularity for different sectors, serving those who are living in or visiting cities and regions;
- Uptake, replication and visibility of circular systemic solutions for sustainable tourism that contributes economically, socially and environmentally to the achievement of the targets of the European Green Deal, circular economy action plan, bioeconomy strategy, industrial strategy and EU agenda for tourism, at local, regional, national and European levels.

Scope: Proposals are expected to implement and demonstrate circular systemic solutions at the level of cities and regions, and include several sectors providing services for visitors and residents such as hospitality, transportation, culture, attractions, nature-based activities.

Tourism can consume large quantities of energy, water, and plastics, which degrade the environmental quality of destinations and ecosystems, affecting the lives of residents. Circular tourism should consider waste and water management, batteries and vehicles, electronics and ICT, packaging, plastics, construction and buildings, GHG emissions of local and long-distance mobility, accommodation and food services.

Proposals should address at least one of these above mentioned sectors.

The complexity of tourism ecosystem lies in the fact that industry is deeply interlinked with and dependent on multiple key resource and commodity chains. Travel and tourism actors can both act as enablers of circularity in a wider economic context, and at the same time benefit from circularity models in other industrial ecosystems. Proposals should develop and demonstrate new and circular business models and technological solutions to change the way

tourism operates, enabling businesses and destinations to be sustainable. This includes developing systemic approaches that steer the behaviour of consumers, whether residents or citizens, towards circularity and makes them participate in circular practices.

The implemented circular systemic solutions should address economic, social and environmental dimensions of the transition towards circular tourism and include science, technology, behavioural and governance components. Proposals are expected to involve the relevant actors, which include public administrations, destination management organisations, private sector services and industries, citizens (residents and visitors), non-governmental organisations and new types of actors rising from collaborative economy platforms.

The development of systemic solutions needs to consider the costs of transition from the existing models into the new ones, analysing trade-offs and challenges related to their implementation and demonstration. As the tourism ecosystem is mostly composed of small actors, micro and SMEs, systemic solutions at the level of cities and regions should develop and test innovative and collaborative ways to create common objectives, targets and processes. The implementation of technologies such as AI, robotics, IoT and blockchain could also be considered in a context-sensitive manner. Proposals should however also investigate simple, low-cost and low-tech solutions. Projects should analyse the encountered obstacles and drivers and provide clear and precise policy recommendations for local authorities on how to improve circular tourism. Each circular systemic solution should address social, economic and environmental externalities and contribute to the well-being of the local communities while improving the circularity behaviour of the visitors.

The circular systemic solutions implemented and their business models should demonstrate a high replicability and scalability potential in order to contribute to the overall transition of tourism towards more sustainable and resilient practices. During their implementation and by the end of their lifecycle, the selected proposals are expected to prepare and share clear and comprehensive guidelines on the circular systemic solutions adopted, including their strengths and weaknesses experienced, mainly for the use of economic operators in the sector.

With regard to the territorial aspects of all proposed solutions, proposals should seek to contribute to the goals and cooperate with the services of the European Commission's Circular Cities and Regions Initiative (CCRI). Joint activities with CCRI projects are encouraged.

The targeted TRL at the end of the projects is 6 to 8.

Innovating for sustainable bio-based systems, biotechnology and the bioeconomy

Proposals are invited against the following topic(s):

HORIZON-CL6-2024-CircBio-01-5: Programmed biodegradation capability of bio-based materials and products, validated in specific environments

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 8.00 million.
Type of Action	Research and Innovation Actions
Technology Readiness Level	Activities are expected to achieve TRL 4-5 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). [290].

Expected Outcome: Successful proposals will enable the bio-based industries in the Union to contribute to the enhancement of European industrial sustainability, competitiveness and resource independence and to the development of innovative and sustainable value-chains in the bio-based sectors. Projects results will contribute to deliver bio-based solutions with reduced environmental impacts on soil, water, and air quality, biodiversity and climate, in line with the EGD objectives, the EU circular economy and the EU zero pollution action plans.

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

- Circular design of bio-based technologies and products: decreasing environmental impacts on soil, water, and air quality, biodiversity and climate, increasing durability and suitability of products to be safely re-used and re-manufactured, allowing for high-quality recycling and for biodegradability.
- Innovative manufacturing processes to enable programming the safe biodegradation of bio-based materials and products according with the environmental conditions and time frame for specific applications.
- Information and labelling of bio-based materials and products with biodegradability capacity for specific applications and end-of-life options.

[290] 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: The amount of waste littered in the open environment and causing pollution from harmful substances released from such waste streams, such as from plastic littering, has reached the level of a global emergency, especially affecting soil and water quality and biodiversity in land and marine environments. The overall low level of recycling of many waste streams, including collected plastic waste, is also part of such global pollution challenge. Biodegradability of materials and products for targeted applications may offer viable end-of-life solutions in case of safe and sustainable biodegradation either in open environments or under controlled conditions, i.e., in composting plants and anaerobic digestors.

To deliver biodegradable bio-based solutions that address the global pollution challenges effectively, proposals should:

- Analyse those cases of uncontrolled waste littering in the open environment, particularly of plastic waste leading to pollution from nano- and micro-plastics and other contaminants released by macro-plastics, and the corresponding safe bio-based applications where biodegradation in open environments could enable safe and sustainable end-of-life options, e.g., in humanitarian contexts [291] where waste management systems for collection, sorting and recycling are not feasible.

- Select applications for biodegradable non-single-use/single-use bio-based materials and products. Such applications should include materials and products which are biodegradable in open environments in those cases of uncontrolled waste littering, as treated in the previous point, and/or other items that may bring some environmental benefits from being biodegradable, for example in cases where products and materials are contaminated from food or from other organic substances during their use;

- Develop manufacturing technologies of such bio-based materials and products with targeted performances: i) decreased carbon footprint (based on the reduction of greenhouse gas emissions and on the increase of carbon removals) and environmental impacts of the production processes; ii) improved circular life extension through predictive maintenance, suitability to be safely re-used and re-manufactured, allowing for recycling, and programmed integrity/biodegradation in specific environments, depending on the application, either in controlled environment (i.e. aerobic digestion in composting plants, anaerobic digestion producing biogas) and in open environments, including in extreme environments in terms of physical conditions; iii) safe biodegradation in the specific environments as in point ii), especially considering the eco-toxicity and any impacts on natural ecosystems from biodegraded materials and from their additives and other components;

- Use innovative and adapt existing AI-based and other digital solutions to optimise the circular lifecycle of products and make it more environmentally and economically sustainable;

[291] See the projects developed under the topic HORIZON-CL6-2023-CircBio-01-6: 'Bio-based solutions for humanitarian applications' for the scoping of the applications in humanitarian contexts.

- Validate tests of biodegradability of bio-based materials designed for specific applications both in controlled and in open environments, e.g., soil and water, under ranges of physical/chemical conditions including extreme conditions. The tests should include the monitoring of the time-frame of partial up to full biodegradation and the environmental impacts in case of biodegradation in open environments, including eco-toxicity and any impacts on biodiversity;

- Provide insights into the development of information and labelling systems to inform users on the most appropriate applications and on the correct use and end-of-life disposal options for the materials and products within the scope. Transparent information should aim at improving the societal acceptance of bio-based innovation and at supporting consumers and customers in making responsible and informed choices. Information should include the assessment of the risks and environmental impacts, including on ecosystems, from an uncontrolled disposal and from littering into the open environments;

- Assess the overall economic feasibility of the manufacturing of the materials and products within the scope.

Where relevant, proposals should seek links with and capitalise on the results of past and ongoing EU funded projects, including under the Circular Bio-based Europe JU, the Processes 4 for Planet partnership and other European partnerships of Horizon Europe.

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.

In this topic the integration of the gender dimension (sex and gender analysis) in research and innovation content is not a mandatory requirement.

In order to achieve the expected outcomes of this topic, international cooperation is encouraged.

HORIZON-CL6-2024-CircBio-01-6: Digital information systems for bio-based products

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 6.00 million.
Type of Action	Research and Innovation Actions

Technology Readiness Level	Activities are expected to achieve TRL 5 – see General Annex B.

Expected Outcome: Successful proposals will support the bio-based industries and the enablers of the digital transition in the Union to contribute to the development of innovative and sustainable value-chains in the bio-based sectors. Projects' results will contribute to deliver bio-based solutions with reduced environmental impacts on soil, water, and air quality, biodiversity and climate, in line with the EGD objectives, the EU circular economy action plan and its sustainable product initiative, the EU sustainable product initiative[292]and the proposal for the Ecodesign for Sustainable Products Regulation[293] as well as the EU data strategy[294].

Projects results are expected to contribute to the following expected outcome:

- Mobilising the potential of digitalisation of bio-based sectors enabling efficient, sustainable and climate neutral production processes and transparent information.

Scope: An effective circular economy needs improved information of material flows used in all economic sectors. Information and data on products and services are key factors to improve their production's sustainability and to meet the performance demands and needs of customers. Sharing data in an accessible and simple way, according to FAIR principles, to enable easy processing, can provide information back to the society, facilitating the inclusiveness of economic activities. Digital technologies can track and report the journeys of products, components and materials and make the resulting data securely access.

The circular economy action plan's sustainable product initiative, the Ecodesign for Sustainable Products Regulation and the EU data strategy provide guidelines to build data and system architectures aiming at improving products sustainability, resources efficiency and circularity, among other goals.

To exploit the potential of digitalisation for the objectives of the EU circular economy in the bio-based sectors, proposal should:

- Design solutions for the digitalisation of information from bio-based products and their value chains, e.g., AI-based, such as digital passports, tagging and watermarks, etc. and enable their use;

- Specialize the information from bio-based products on impacts on climate , based on estimates of carbon emissions and carbon removals, environmental impacts on soil, water, and air quality and biodiversity, end-of-life options, safety control, technical

[292] COM/2020/696 final COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL New Consumer Agenda Strengthening consumer resilience for sustainable recovery.

[293] COM(2022) 142 final Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing a framework for setting ecodesign requirements for sustainable products and repealing Directive 2009/125/EC.

[294] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-data-strategy_en.

performances, predictive maintenance, and programmed integrity/biodegradation, among other data;

- Design the information from bio-based products to improve the societal readiness adaptation in terms of acceptability, and uptake of innovations by society. The information should be easily accessible by customers and consumers and to support them in making responsible and informed choices;
- Support the harmonisation and interoperability of the digital information formats;
- Enable bio-based industries to participate in the European Dataspace for Smart Circular Applications;
- Design the interfaces between the digital information from bio-based products and other applications of digital technologies ensuring interoperability in the Union.

Where relevant, proposals should seek links with and capitalise on the results of past and ongoing EU funded projects, including under the Circular Bio-based Europe JU.

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. Moreover, the link between digitalisation and the resilience of economies to disruptions, such as the one suffered from COVID-19 crisis, should be part of the societal impacts assessment.

HORIZON-CL6-2024-CircBio-01-7: Demonstrating the fair and just transition from GHG-intensive economies facing challenges towards circular bioeconomy model regions

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	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The proposals must use the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B.

Expected Outcome: Successful proposal will contribute to the expected impacts of the Destination 'Circular economy and bioeconomy sectors' and the European policies it supports. In line with the European Green Deal priorities, the EU's climate ambition for 2030 and 2050, the objectives of the EU biodiversity strategy for 2030, and the vision of a society that acts within environmental and social boundaries as defined in the bioeconomy strategy, the successful proposal will guide and facilitate the green transition towards a circular bioeconomy model, in regions that lag behind in this process.

Projects results are expected to contribute to all following expected outcomes:

- Showcased solutions in 2-3 selected coal mining regions and/or intensive agriculture regions, ensuring geographical coverage of different regions.
- Development of new bioeconomy structures that generate local green growth in regions currently relying on GHG-intensive economic activities, focusing on coal mining and/or intensive livestock or crop production in agriculture;
- Strengthened interactions and coordination between affected European / Associated Countries regions.

Scope:

- Demonstrate just and fair bioeconomy solutions in regions that face difficulties in the green transition to leave no person and no place behind.
- Interact with and draw on the logistical support of the CSA "Supporting the fair and just transition from GHG-intensive economies facing challenges towards circular bioeconomy model regions" with the overall goal to demonstrate the transition to a just and fair bioeconomy for in 2-3 selected coal mining regions and/or intensive agriculture regions.
- Demonstrate the feasibility of transforming regions towards sustainable and resource-efficient bioeconomy models, while highlighting the achievement of climate targets, as well as assessing trade-offs (e.g., food security or energy-security, strategic autonomy).
- Social innovation is recommended when the solution is at the socio-technical interface and requires social change, new social practices, social ownership or market uptake.
- Implement the required multi-actor approach by involving a wide diversity of bioeconomy actors and conducting trans-disciplinary research.
- Where relevant, activities should build and expand on the results of past and ongoing research projects.
- 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-CL6-2024-CircBio-01-8: Bioeconomy project development assistance

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 3.00 million.
Type of Action	Coordination and Support Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The proposals must use the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.
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). [295].

Expected Outcome: In line with the European Green Deal priorities, the EU's climate ambition for 2030 and 2050 and the bioeconomy strategy vision of an economic system that acts within environmental and social boundaries, the successful proposal will improve the deployment of sustainable bioeconomy business models and solutions, which will help rural and coastal areas in achieving a just, green transition.

Projects results are expected to contribute to all following expected outcomes:

- Increased access to financial, legal and technical support along all Technological Readiness Levels and whole supply chains for bioeconomy projects, leading to a higher number of successful bioeconomy flagship projects.
- Alignment of actors (primary producers, citizens, innovators, educators, SMEs, industry, national authorities and other actors) and their goals in collaborative ventures on bioeconomy related projects.

[295] 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

- Promotion and support of regional and national transitions from existing fossil-based socio-technical systems to bioeconomy-based systems promoting the valorisation of local biological resources and ecosystem services.

Scope:

- Provide technical assistance for bioeconomy project development and facilitate synergies and linkages between different EU and national policy instruments and funding opportunities (e.g., CBE JU, ERDF, CAP, EMFAF, Innovation Fund) and therefore support the deployment of bioeconomy through the streamlining of research, innovation and demonstration. Public, private and joint public-private projects are eligible.

- Bring together and align the goals of primary producers, SMEs, policymakers and other stakeholders in bioeconomy projects along the whole value chain in order to build collaborative partnerships with a strong technical, financial, and legal capacity.

- Provide expertise and consultancy services to promising bioeconomy projects, on small and medium-sized investments at different TRLs, in the area of business model development (including exploring supply chain options), planning, project documentation, feasibility assessment, financial assistance, including links to other EU funding instruments, and legal assistance.

- Explore the barriers faced by novel bioeconomy solutions and provide strategies how to overcome social, financial, legal and policy barriers.

- Projects benefiting from the assistance should contribute to the development of sustainable bioeconomy solutions and have their main activities in one or more of the following areas (a non-exhaustive list): circular and sustainable bio-based sector, including improvements in durability, quality, or resource-efficiency of bio-based products; activities enhancing biodiversity and land-based climate mitigation and adaptation; integration of the benefits of biodiversity and carbon-rich ecosystems in primary production; low footprint food production, processing and distribution, including novel foods; schemes for rewarding land and water managers for the provision of ecosystems services; sustainable fisheries, aquaculture and algae production; nature-based solutions.

- Assisted projects will be selected on the basis of merit. Proportionality of assisted projects across the different bioeconomy sectors as well geographical regions shall be ensured. Special focus should be given to projects from Member States where bioeconomy in underdeveloped.

- The technical support facility is expected to carry out the project assistance activities for the minimum duration of 5 years and be open to projects from all EU Member States and Associated Countries.

- Social innovation is recommended when the solution is at the socio-technical interface and requires social change, new social practices, social ownership or market uptake.
- The proposals must use the multi-actor approach by involving a wide diversity of bioeconomy actors.
- Where relevant, activities should build and expand on the results of past and ongoing research projects.

HORIZON-CL6-2024-CircBio-01-9: Circular bioeconomy start-up villages

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 0.80 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 2.50 million.
Type of Action	Coordination and Support Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The proposals must use the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.
Procedure	The procedure is described in General Annex F. The following exceptions apply: To ensure a balanced portfolio, grants will be awarded to applications not only in order of ranking but at least also to one project within the area A that is the highest ranked, one project highest ranked within the area B, and one project highest ranked within the area C, provided that the applications attain all thresholds. Proposals shall clearly indicate the area they are applying to.
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: In line with the European Green Deal priorities, the EU's climate ambition for 2030 and 2050, the long-term vision for the EU's rural areas and its flagship initiative on research and innovation for rural communities, the European innovation agenda, the EU biodiversity strategy for 2030, the bioeconomy strategy and its vision of an economic system that acts within planetary boundaries and fosters a just transition, the successful proposal will support the development of circular systemic bioeconomy solutions in start-up villages across Europe. The proposal will contribute to the expected impacts of Destination 3 'Circular economy and bioeconomy sectors', by accelerating rural fair and just transitions, developing innovative and sustainable value-chains and sharing platforms (e.g. Startup Village Forum[297]).

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

- Development and transfer of the concept of sustainable circular bioeconomy solutions in start-up villages;
- Showcased novel governance and business models for circular systemic bioeconomy solutions in start-up villages or their groupings;
- Strengthened position of bioeconomy start-ups in rural innovation ecosystems for the development of new value-added products, technologies and approaches;
- Enhanced training opportunities and knowledge exchange and cooperation among rural innovators;
- Improved rural innovation ecosystems to build a sustainable bioeconomy within ecological boundaries based on local resources, in particular contributing to climate and biodiversity policies and targets.

Scope: Applicants should demonstrate how they will provide innovative circular, sustainable and socially fair bioeconomy solutions for:

A. food systems transformation;

B. bio-based sectors, covering biological waste/residues and bio-based materials and products;

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

297 The Startup Village Forum intends to promote knowledge exchange and cooperation activities and to work as an open space where institutions and stakeholders can meet, discuss and shape action for startup-driven innovation in rural areas. Besides, the Forum aims to collect the commitment of public and private organisations to support Startup Villages.

C. employing digital technologies and approaches.

Applicants should address only one of the thematic areas above, and clearly indicate it in their proposal.

Proposals are expected to contribute to the creation and support of a thematic network of start-up villages based on bioeconomy concepts, including all of the following activities:

- Provide assistance and advisory support for the development and linking of startup villages and raise awareness of the rural innovators on sustainable and circular systemic bioeconomy solutions.

- Develop the Start Up Village Forum initiative through a community of practice to support active engagement of all relevant actors (local and regional authorities, entrepreneurs, investors, rural cooperatives, rural communities and others) in the start-up villages and foster knowledge exchange and mutual learning between them, as well as share research, data and analytical findings.

- Develop a list of case studies of local and regional start-up villages focusing on bioeconomy including sustainable food systems and bio-based solutions, identifying and presenting the respective strengths, weaknesses, and opportunities. These case studies could be used for replication and dissemination across Europe in the context of the Startup Village Forum. Proposals should involve at least three start-up villages from three different Member States / Associated Countries, ensuring geographical coverage of different regions.

- Identify the challenges and development pathways for developing and scaling up of start-ups and small and medium-sized enterprises (SMEs) for a sustainable bioeconomy, including businesses linked to agriculture, food, forestry, bio-based innovation and non-agricultural activities in rural areas related to the community-led local development strategies.

- Address the challenges of Europe's fragmented start-up scene and of entrepreneurship education and capacity building.

- Assess possible options and create guidelines and recommendations for policy makers, investors and rural innovators summarizing, sharing and presenting existing best practices and innovations to enable replication of successful cases across Europe.

- The proposals should build on the knowledge and tools already generated by the BioeconomyVentures[298] and Pilots4U[299] projects developed under Horizon 2020, as well as seek complementarities with related actions and existing[300] and upcoming[301] relevant

298 https://cordis.europa.eu/project/id/101023260.
299 https://cordis.europa.eu/project/id/745667.
300 BE-Rural, Power4Bio, BIOEASTsUP, SIMRA.
301 HORIZON-CL6-2023-CIRCBIO-02-1-two-stage: Circular Cities and Regions Initiative (CCRI)'s circular systemic solutions; HORIZON-CL6-2024-CIRCBIO-01-8: Bioeconomy Project Development

projects on bioeconomy governance and ensure inclusiveness and engagement of all actors. It is also relevant to cooperate and establish links with the Circular Bio-based Europe (CBE) JU, and relevant EIT KICs.

- Seek synergies and complement the knowledge and cooperation activities of the Startup Village Forum. Cooperate with "Rural networks" (soon to become the CAP networks) including the European innovation partnership on agriculture productivity and sustainability (EIP-AGRI) and the European Network for Rural Development (ENRD), and Horizon Europe Partnership Sustainable Food Systems.

- Proposals should explore all available financing instruments on a European level, including relevant regional instruments (Cohesion Fund, CAP, ESF and others). Proposals should also describe how they plan to complement the ongoing activities of bodies such as the European Innovation Council, the Circular Bioeconomy Investment Platform, and the Enterprise Europe Network and European Institute of Technology (EIT) initiatives.

- Social innovation is relevant for this topic as it contributes to strengthened rural innovation ecosystems and to find solutions for rural communities when the solution is at the socio-technical interface and requires social and behavioural change, new social practices, social ownership or market uptake. Proposal should contribute to improve the quality of life and long-term socio-economic prospects of rural and coastal communities, including women (especially supporting women-led SMEs and start-ups), youth and the most vulnerable groups like indigenous people or minorities and refugees.

- This topic requires the effective contribution of SSH disciplines.

Innovating for blue bioeconomy and biotechnology value chains

Proposals are invited against the following topic(s):

HORIZON-CL6-2024-CircBio-01-10: Targeting aquatic extremophiles for sourcing novel enzymes, drugs, metabolites and chemicals

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.

Assistance, HORIZON-CL6-2023-GOVERNANCE-01-5: Revitalisation of European local (rural / peri-urban) communities with innovative bio-based business models and social innovation, HORIZON-CL6-2021-COMMUNITIES-01-02- Expertise and training centre on rural innovation.

Type of Action	Research and Innovation Actions
Technology Readiness Level	Activities are expected to achieve TRL 3-5 by the end of the project – see General Annex B.

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

- Contribution to expanding the sustainable exploration of biodiversity hotspot regions, e.g., transitional waters, deep-sea, polar regions;
- Advances in the development of the next generation of sampling methods, technologies, as well as understanding of the legal frameworks within which the development process operates;
- Better preparedness to harvest aquatic bioactive substances in the most environmental friendly manner and support to green industrial bioprocessing with more sustainable bio-based products through bio discovery of novel sources and new biotechnology processes and applications;
- Expansion of bioprospecting from the screening for new chemicals into biological function;
- Advancement in understanding the ecology of marine or other aquatic ecosystems, including possibly the ones on water surface, in sediments, in the internal cavity of sponges etc.;
- Increased commitment to conserve and sustainably use the ocean's genetic diversity and contribution to the understanding of potential trade-offs inherent in the exploitation of ocean, and other aquatic, biodiversity.

Scope: Extreme environments with huge bio-resources still present enormous challenges for exploration and sampling operations. Challenges are often due to the depth, pH, salinity, temperature and pressure conditions, which make exploration technically difficult, risky and expensive.

Proposals under this topic should explore marine or other aquatic ecosystems with complex and extreme conditions such as temperature, pressure, alkalinity or acidity/pH level, extremely low nutrients, etc. with focus on extremophilic organisms capable of thriving/surviving in such extreme environments (e.g., deep hydrothermal vents, hypersaline lagoons, sub-seafloor sediments). They should develop or optimise tailor-made sampling methods, explore the metabolic, physiological and other adaptation mechanisms to such extreme ecological conditions and look for novel and highly efficient metabolites, drugs, enzymes and chemicals for industrial application.

They should disseminate their results in the most efficient and transparent manner considering the risks and ethics related to science & technology in compliance with EU regulations on

access to genetic resources and the fair and equitable sharing of benefits arising from their utilisation (ABS) in the EU.

Selected projects should collaborate with each other.

In this topic the integration of the gender dimension (sex and gender analysis) in research and innovation content is not a mandatory requirement.

Call - Circular economy and bioeconomy sectors

HORIZON-CL6-2024-CIRCBIO-02

Conditions for the Call

Indicative budget(s)[302]

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million)[303]	Indicative number of projects expected to be funded
		2024		
Opening: 17 Oct 2023 Deadline(s): 22 Feb 2024 (First Stage), 17 Sep 2024 (Second Stage)				
HORIZON-CL6-2024-CircBio-02-1-two-stage	RIA	15.00	Around 5.00	3
HORIZON-CL6-2024-CircBio-02-2-two-stage	IA	10.00	Around 5.00	2
HORIZON-CL6-2024-CircBio-02-3-two-stage	IA	10.00	Around 5.00	2
HORIZON-CL6-2024-CircBio-02-4-two-stage	IA	15.00	Around 5.00	3
HORIZON-CL6-2024-CircBio-02-5-two-stage	RIA	8.00	Around 4.00	2
HORIZON-CL6-2024-CircBio-02-6-two-stage	IA	15.00	Around 5.00	3
Overall indicative budget		73.00		

302 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 years 2023 and 2024.

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

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.

Enabling a circular economy transition

Proposals are invited against the following topic(s):

HORIZON-CL6-2024-CircBio-02-1-two-stage: Circular solutions for textile value chains through innovative sorting, recycling, and design for recycling

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
Admissibility conditions	The conditions are described in General Annex A. The following exceptions apply: Applicants submitting a proposal under the blind evaluation pilot (see General Annex F) must not disclose their organisation names, acronyms, logos, nor names of personnel in Part B of their first stage application (see General Annex E).

Technology Readiness Level	Activities are expected to achieve TRL 5-6 by the end of the project – see General Annex B.
Procedure	The procedure is described in General Annex F. The following exceptions apply: This topic is part of the blind evaluation pilot under which first stage proposals will be evaluated blindly.

Expected Outcome: A successful proposal will contribute to the following Destination impacts: i) enhance European industrial sustainability, competitiveness and resource independence, and ii) improve on consumer and citizen benefits.

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

- Roll-out of systemic solutions for textile sorting, using innovative digital technologies (such as AI, robotics, IoT and blockchain);
- Roll-out of feasible solutions for facilitated disintegration to be incorporated in product design, as an enabler for recycling;
- Increased uptake of mechanical recycling solutions that deliver competitive, high-quality secondary materials;
- Roll-out of thermo-mechanical, chemical and other (e.g., enzymatic) recycling solutions that are sustainable from a zero-pollution, circular material and energy efficiency perspective.

Scope: The topic aims at improved management of the end-of-life phase of textile products. Proposals should address one or more of the following subjects and aim to combine them where relevant in a systemic way: facilitation of the disintegration of textile products through design, sorting, and recycling of textiles.

Textiles are the fourth highest-pressure category for the use of primary raw materials and water and fifth for GHG emissions and a major source of microplastic pollution in production and use phases. They are also a key material and product stream in the circular economy action plan. The purpose of this initiative is also to minimise the use of hazardous substances in processing and textile treatments. Proposals shall also demonstrate and deploy innovative solutions for increased quality, non-toxicity and durability of secondary textile materials and their processing and treatments.

Facilitation of the disintegration of textile products:

Beside the fibre composition affecting recyclability, textile products can also consist of various non-textile components or accessories, and can be coated, laminated or printed on. These hard parts, trims, coatings and laminated layers hamper recycling and are a major barrier for practically all textile fibre recycling technologies, especially chemical recycling technologies. The removal of these non-textile components requires disassembly prior to

recycling, adding costs to the overall recycling process. Despite the various research projects on this topic, the implementation and uptake of these techniques is still far from reality. Proposals should address these challenges. New approaches should also be tested, involving technologies such as robotics and AI. Irrespective of the remaining technological and economical challenges, the implementation of disintegration techniques also requires a system, in which products that are fitted with any of these techniques are properly collected, recognised, and sent towards the right facility to apply the appropriate triggering mechanism.

Systemic solutions for sorting:

Over the coming years, the collected volumes of post-consumer textile waste are expected to increase by a further 65,000 to 90,000 tonnes per year due to the increased amounts of textiles placed on the market and the obligation to separately collect textile waste, which Member States have to put in place by 1 January 2025. This will further increase the need for advanced sorting for collecting organisations in order to create economic value out of this. At the moment, sorting is still mainly a manual process, having a significant contribution to the total process costs of recycled textile fibres. The cost of manual sorting is a major barrier to cost effective production of feedstock for textile fibre recycling. Automated sorting has the potential to deliver sufficient, well-defined and low-cost input to recycling processes, however, to date, this potential is not yet fulfilled. New technologies exist, but their limitations need to be addressed. Due to the limited penetration depth of NIR light, only the surface composition of textiles can be detected. RFID technology requires the textile products to carry an RFID tag and an entire system behind, adapted by all parts of the value chain. Therefore, proposals should develop systemic digital solutions that facilitate traceability and comprehensive exchange of information along the entire value chain, involving the use of technologies such as blockchain, AI and IoT. Proposals should build knowledge and competence regarding information system models, systems for data collection, provide an overview of existing standards and mapping of standardisation needs, include cost calculations and evaluation of Return On Investment (ROI), and consider implications of integrating digital information carriers in textile products.

Further development of textile recycling technologies:

In view of the huge amount of textile waste, which will have to be handled due to the soon mandatory separate collection, possible product requirements such as recycled content and the potential offered by different types of textile recycling, different ways of textile recycling remain relevant and will all be needed in the implementation of the textiles strategy. Mechanical recycling of textiles is an established technology in the market. However, the amount of spinnable fibre and the quality of the fibres should be improved. The integration of robotics, AI, or IoT components will play a role in the improvement of these processes. Thermo-mechanical recycling is a process that is still under development and further research is needed to improve the yield of recycled content and the use of chemicals to increase the quality of the polymer. Chemical and enzymatic recycling are novel technologies. Proposals should upscale polymer recycling of cotton via a pulping process and incorporate customer feedback for optimisation of the process and continuous delivery of suitable textile waste (in

terms of purity and composition) as feedstock. Other options that can be explored are the recycling of polycotton blends and the monomer recycling of PET. The application of these technologies in research and innovation should also be extended to other types of fibres.

Clustering activities with projects under "HORIZON-CL6-2024-CIRCBIO-01-2: Circular solutions for textile value chains based on extended producer responsibility" should be envisaged. A lifecycle perspective using LCA and LCC should be used when validating the technical and economic feasibility of the developed, improved, demonstrated and up-scaled processes. Proposals should also address the issue of side streams such as wastewater and the treatment and reuse. Novel value chain-based solutions through industrial symbiosis should be encouraged. For comparability reasons, LCAs should use well-established methods and be based on PEF wherever feasible. Proposals should fully incorporate the Safe and Sustainable by Design (SSbD) approach. Particular attention should also be given to the implementation of traceability solutions, also with a view to recent policy developments, e.g. the digital product passport. The participation of SMEs and industry is encouraged.

The targeted TRL at the end of the projects is 5 to 6.

HORIZON-CL6-2024-CircBio-02-2-two-stage: Increasing the circularity in plastics value chains

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
Admissibility conditions	The conditions are described in General Annex A. The following exceptions apply: Applicants submitting a proposal under the blind evaluation pilot (see General Annex F) must not disclose their organisation names, acronyms, logos, nor names of personnel in Part B of their first stage application (see General Annex E).
Technology Readiness Level	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B.
Procedure	The procedure is described in General Annex F. The following exceptions apply: This topic is part of the blind evaluation pilot under which first stage proposals will be evaluated blindly.

Expected Outcome: A successful proposal will contribute to the following Destination impacts: i) enhance European industrial sustainability, competitiveness and resource independence, and ii) improve on consumer and citizen benefits.

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

- Increased deployment and demonstrated benefits of advanced digital solutions (e.g., through AI, robotics, IoT and blockchain) in circular businesses including waste management and recycling;
- Emergence of new value chains using upcycled and/or recycled resources, e.g. through industrial symbiosis;
- Increased upcycling and recycling rates for the targeted material streams;
- Increased uptake of recycled material and upcycling to new higher-value products;
- Increased resource efficiency along and across value chains, causing a measurable reduction in GHG emissions and other environmental pollution and an increase of carbon removals;
- Increased diffusion of new circular business practices, in particular in the uptake of repair, reuse and remanufacturing, but also practices that form part of the sharing economy.

Scope: The new circular economy action plan (CEAP) highlights plastics as one of the four particularly important material and product streams with regard to their circularity potential and their environmental footprint. The circularity deficits for these streams are mainly due to the: lack of trust in secondary raw materials; lack of control over supply chains; lacking focus on material efficiency and design for circularity; unsustainable product lifetimes; lack of repair services; price gap between primary and secondary material; lack of secondary material markets; insufficient collection and sorting systems; insufficient and unpredictable input quality for recycling; insufficient information about quality and quantity of materials, including knowledge about possible microplastics pollution and substances of concern, lack of communication along the lifecycle between manufacturers and recyclers; lack of involvement and empowerment of citizens that would allow environmentally informed purchases.

Proposals should address the priorities set in the CEAP. Beside the continuous implementation of the EU plastics strategy, the CEAP has a strong focus on microplastics, but also calls for mandatory recycled content and the controlled use of bio-based, biodegradable plastics and alternative materials.

Proposals should demonstrate and deploy at large scale innovative solutions and designs for increased quality, non-toxicity and durability of secondary materials and increased share of secondary materials in new products. Proposals should demonstrate increased recovery, recycling and upcycling rates and a higher uptake of secondary materials for high value

applications. Special attention should be given to the increased circularity of critical raw materials186. Proposals should also demonstrate circular business practices, in particular in the uptake of repair and reuse, remanufacture, product-service-systems, and in the full lifetime of products or services. To achieve this, targeted market size, economic feasibility, cost efficiency and social acceptance need to be addressed. To break down the barriers for this transition, it is important that proposals involve and address the different perspectives of all relevant actors, e.g., manufacturers, retailers, consumers and civil society organisations (CSOs). The projects should consider the use of digital solutions (including technologies such as AI, robotics, IoT and blockchain) and demonstrate their benefits for increased circularity. Proposals should aim to implement traceability solutions in support of recent policy developments, e.g. regarding the digital product passport. Projects should also help produce harmonised and robust methods to assess the amount of recycled content in sectoral products, which is key for a future review of green claims through authorities and consumer organisations. Environmental, social and economic impacts should be assessed from a lifecycle perspective as product, organisation and consumption environmental footprints, using the respective methods developed by the European Commission (Product Environmental Footprint, PEF, should be used for the assessment of the environmental impacts) and through costing methods; relevant data should be fed into the European Platform on Life Cycle Assessment, following the specific Environmental Footprint data and format requirements. The functional performance of technologies and secondary materials can be assessed through the EU Environmental Technology Verification (ETV) scheme. All project results should be validated using quantitative indicators and targets wherever possible.

Projects should also develop training material to endow workers in this occupational group with the right skillset in order to deploy the new technologies developed. Proposals should consider the development of learning resources for the current and future generations of employees, with the possibility to integrate them in existing curricula and modules for undergraduate level and lifelong learning programmes. The projects should provide contributions to relevant standards or best practices.

Proposals should build on ongoing projects funded under Horizon 2020 and Horizon Europe and envisage clustering activities with these. Social innovation is recommended when the solution is at the socio-technical interface and requires social change, new social practices, social ownership or market uptake.

The targeted TRL at the end of the projects is 6 to 8.

HORIZON-CL6-2024-CircBio-02-3-two-stage: Increasing the circularity in electronics value chains

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
Admissibility conditions	The conditions are described in General Annex A. The following exceptions apply: Applicants submitting a proposal under the blind evaluation pilot (see General Annex F) must not disclose their organisation names, acronyms, logos, nor names of personnel in Part B of their first stage application (see General Annex E).
Technology Readiness Level	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B.
Procedure	The procedure is described in General Annex F. The following exceptions apply: This topic is part of the blind evaluation pilot under which first stage proposals will be evaluated blindly.

Expected Outcome: A successful proposal will contribute to the following Destination impacts: i) enhance European industrial sustainability, competitiveness and resource independence, and ii) improve on consumer and citizen benefits.

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

- Increased deployment and demonstrated benefits of advanced digital solutions (e.g., through AI, robotics, IoT and blockchain) in circular businesses including waste management and recycling;
- Emergence of new value chains using upcycled and/or recycled resources;
- Increased upcycling and recycling rates for the targeted material streams;
- Increased uptake of recycled material and upcycling to new higher-value products;
- Increased resource efficiency along and across value chains, causing a measurable reduction in GHG emissions and other environmental pollution and an increase of carbon removals;
- Increased diffusion of new circular business practices, in particular in the uptake of repair, reuse and remanufacturing, but also practices that form part of the sharing economy.

Scope: The circular economy action plan (CEAP) highlights electronics including information and communications technology (ICT) equipment as one of the four particularly important material and product streams with regard to their circularity potential and their environmental

footprint. The circularity deficits for these streams are mainly due to the: lack of trust in secondary raw materials; lack of control over supply chains; lacking focus on material efficiency and design for circularity; unsustainable product lifetimes; lack of repair services; price gap between primary and secondary material; lack of secondary material markets; insufficient collection and sorting systems; insufficient and unpredictable input quality for recycling; insufficient information about quality and quantity of materials, including knowledge about possible microplastics pollution and substances of concern, lack of communication along the lifecycle between manufacturers and recyclers; lack of involvement and empowerment of citizens that would allow environmentally informed purchases.

Proposals should address the priorities set in the CEAP, which states that "electrical and electronic equipment continues to be one of the fastest growing waste streams in the EU, with current annual growth rates of 2%. It is estimated that less than 40% of electronic waste is recycled in the EU. Value is lost when fully or partially functional products are discarded because they are not reparable."

Proposals should demonstrate and deploy at large scale innovative solutions and designs for increased quality, non-toxicity and durability of secondary materials and increased share of secondary materials in new products. Proposals should demonstrate increased recovery, recycling and upcycling rates and a higher uptake of secondary materials for high value applications. Special attention should be given to the increased circularity of critical raw materials186. Proposals should also demonstrate circular business practices, in particular in the uptake of repair and reuse, remanufacture, product-service-systems, and in the full lifetime of products or services. To achieve this, targeted market size, economic feasibility, cost efficiency and social acceptance need to be addressed. To break down the barriers for this transition, it is important that proposals involve and address the different perspectives of all relevant actors, e.g., manufacturers, retailers, consumers and civil society organisations (CSOs). The projects should consider the use of digital solutions (including technologies such as AI, robotics, IoT and blockchain) and demonstrate their benefits for increased circularity, also analysing and addressing possible trade-offs. Proposals should aim to implement traceability solutions in support of recent policy developments, e.g. regarding the digital product passport. Projects should also help produce harmonised and robust methods to assess the amount of recycled content in sectoral products, which is key for a future review of green claims through authorities and consumer organisations. Environmental, social and economic impacts should be assessed from a lifecycle perspective as product, organisation and consumption environmental footprints, using the respective methods developed by the European Commission (Product Environmental Footprint, PEF, should be used for the assessment of the environmental impacts) and through costing methods; relevant data should be fed into the European Platform on Life Cycle Assessment, following the specific Environmental Footprint data and format requirements. The functional performance of technologies and secondary materials can be assessed through the EU Environmental Technology Verification (ETV) scheme. All project results should be validated using quantitative indicators and targets wherever possible.

Projects should also develop training material to endow workers in this occupational group with the right skillset in order to deploy the new technologies developed. Proposals should consider the development of learning resources for the current and future generations of employees, with the possibility to integrate them in existing curricula and modules for undergraduate level and lifelong learning programmes. The projects should provide contributions to relevant standards or best practices.

Proposals should build on ongoing projects funded under Horizon 2020 and Horizon Europe and envisage clustering activities with these. Social innovation is recommended when the solution is at the socio-technical interface and requires social change, new social practices, social ownership or market uptake.

The targeted TRL at the end of the projects is 6 to 8.

HORIZON-CL6-2024-CircBio-02-4-two-stage: New circular solutions and decentralised approaches for water and wastewater management

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	Innovation Actions
Admissibility conditions	The conditions are described in General Annex A. The following exceptions apply: Applicants submitting a proposal under the blind evaluation pilot (see General Annex F) must not disclose their organisation names, acronyms, logos, nor names of personnel in Part B of their first stage application (see General Annex E).
Technology Readiness Level	Activities are expected to achieve TRL 6-8 by the end of the project – see General Annex B.
Procedure	The procedure is described in General Annex F. The following exceptions apply: This topic is part of the blind evaluation pilot under which first stage proposals will be evaluated blindly.

Expected Outcome: In support of the European Green Deal and EU water-related policies, successful proposals will contribute achieving sustainable and circular management and use of water resources, as well as prevention and removal of pollution, in particular Destination ‘Circular economy and bioeconomy sectors' impact ‘Accelerate transitions towards a

sustainable, regenerative, inclusive, just and clean circular economy based on enhanced knowledge and understanding of science'.

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

- Demonstrate the benefits of decentralised approaches for water and wastewater treatment in various geographic, climate and economic conditions and create a decision framework to help policy makers to see where a decentralised approach can bring the most overall benefits with regards to the centralised one, as well as, how to better design their integration.

- Improve co-design and co-creation processes and synergies between all relevant stakeholders and enhance public engagement to speed up the market uptake of decentralised and/or semi-decentralised solutions.

- An enhanced systemic circular economy approach along the water, cycle by using process integration, to minimise water pollution, water consumption and the environmental footprint (including energy use) of water activities and ensure water security.

- Support the implementation of relevant EU policy needs (e.g., water and marine related policies, water reuse regulation, climate change adaptation strategy, circular economy action plan, the EU zero pollution action plan, and chemical strategy for sustainability).

Scope: With a rapidly changing urban, peri-urban and rural environments, increasing flooding and contamination of water resources, and in order to reap the benefits of circular economy approaches, adapt to climate change and support the implementation of water supply and sanitation related SDG, innovative approaches and technologies are required. Such innovative approaches should go beyond the central objective of protecting human health and environment, by enabling the overall concept of circularity and sustainability in terms of economic feasibility, social equity and acceptance, technical and institutional applicability, environmental protection, and resource recovery.

Moreover, the current COVID19 pandemic highlighted the essential role of safely managed water supply, sanitation, and hygiene services for preventing disease and protecting human health during infectious disease outbreaks and constitutes a good opportunity to revisit strategies implemented so far, and to build a more sustainable society meeting basic needs such as water and sanitation for all.

Decentralised water and wastewater systems can play an important role in delivering such an innovative approach and has the potential for a sustainability transition of the water supply and sanitation sector, by treating wastewater close to its source. However, full and appropriate exploitation of these systems, requires further developments, in order to become economically affordable, ecologically sustainable and socially accepted. In addition, the integration between centralised and local, decentralised and/or semi-decentralised solutions should be further explored.

Actions in this topic should further develop efficient and sustainable decentralised and distributed approaches and technologies for climate-neutral and zero pollution water supply and wastewater treatment to optimise circular and sustainable use of natural resources, including integrated stormwater management systems to encourage water management on site rather than to the sewer. The impact of reduced sewer flows, more concentrated sewage and waste sludge discharges from decentralised systems on sewer infrastructure should be better assessed. A thorough comparison of the overall environmental and economic performance of ongoing decentralized water and wastewater systems in different geographical and climate conditions and their potential for climate mitigation and adaptation should be undertaken, in order to assess under which conditions decentralised systems perform better than the centralised ones and help to create the right enabling environment to overcome various regulatory and technological barriers related to the implementation of these approaches. New urban sanitation models based on decentralised and integrated approaches which consider municipal organic waste and wastewater as source for recovery and recycling materials such as organic matter and nutrients that are included in the organic fraction of municipal solid waste and wastewater streams, could be also considered.

The integration of decentralised and centralised systems for water supply and sanitation is particularly needed in highly urbanised areas where centralised systems are currently used, to provide better water services, by reconciling, for instance, the need to meet an increasing water demand and new quality standards in an economic and sustainable manner, including energy efficiency and production. In this context, this action should:

- Develop an overarching risk analysis and optimization framework for the integrated design and operation of multiple source water supply systems, enhancing the application of digital technologies and solutions.

- Demonstrate the potential of the integration of decentralised with centralised systems for water supply and sanitation in different areas and scales (eg. district level, cities, river basin), to assess the potential benefits/drawbacks, strengthening public participation and engagement and public private partnerships.

- Address potential regulatory, financial and socioeconomic bottlenecks with a view of promoting long-term performance-based business models in public private partnerships for decentralised and/or integrated decentralised and centralised systems.

This action should bring together relevant researchers, technology providers, water utilities, business representatives, investors, policy makers and other water users and citizens. The active participation and engagement of different stakeholders should span the entire project development and implementation to ensure performance and sustainability and maximise the final impact.

To reinforce the potential benefits of implementing these decentralised approaches to policy makers their social impact, notably in terms of employment generation and population settlement in decentralised territories should be demonstrated.

The inclusion of relevant SSH expertise would be also needed to ensure the proposed solutions are also socially accepted.

Decentralised approaches for water and wastewater systems provides significant opportunities for developing countries and emerging economies to establish new alternatives and more sustainable approaches to water supply and sanitation and support the implementation of related SDGs. International cooperation is therefore strongly encouraged.

Innovating for sustainable bio-based systems, biotechnology and the bioeconomy

Proposals are invited against the following topic(s):

HORIZON-CL6-2024-CircBio-02-5-two-stage: Circular design of bio-based processes and products

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 8.00 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 under the blind evaluation pilot (see General Annex F) must not disclose their organisation names, acronyms, logos, nor names of personnel in Part B of their first stage application (see General Annex E).
Technology Readiness Level	Activities are expected to achieve TRL 5 by the end of the project – see General Annex B.
Procedure	The procedure is described in General Annex F. The following exceptions apply: This topic is part of the blind evaluation pilot under which first stage proposals will be evaluated blindly.

Expected Outcome: Successful proposals will enable the bio-based industries in the Union, including SMEs, to contribute to the enhancement of European industrial sustainability, competitiveness and resource independence and to the deployment of innovative and sustainable value-chains in the bio-based sectors as a prerequisite and driver of future solutions for a circular economy and the bioeconomy transitions. Projects results will contribute to deliver bio-based solutions with reduced environmental impacts on soil, water,

and air quality, biodiversity and climate, in line with the EGD objectives, the EU circular economy and the EU zero pollution action plans, the bioeconomy strategy and the communication on sustainable carbon cycles.

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

- Circular design of bio-based processes and products: increasing resources and energy efficiency of bio-based technologies, decreasing their environmental impacts on soil, water, and air quality, biodiversity and climate, improving durability and suitability of bio-based products to be safely re-used and re-manufactured, allowing for high-quality recycling, increasing the safe recycled content in new products;

- Product information systems enabling the circularity, safety and environmental sustainability of the bio-based manufacturing sectors and of the use of products at consumers' level.

Scope: The bio-based processes and products within the scope of this topic do not include food, feed, biofuels, bioenergy and cultural and recreation sectors. The establishment of safe, resilient, competitive and equitable production and consumption systems with reduced environmental impacts on soil, water, and air quality, biodiversity and climate, is part of the objectives of the EU circular economy.

To improve the capacity of the industrial bio-based sectors within the scope of the topic, especially the manufacturing sectors, to contributing to that objective, proposals should:

- Develop optimized design of bio-based processes and bio-based products to improve their circularity, taking into account the opportunity to re-use recycled materials in the local market. This could be achieved through increasing resources and energy efficiency of processes, improving high-quality recycling technologies, increasing the durability of products and their suitability to be safely re-used and re-manufactured, improved products end-of-life options, increasing the safe recycled content in new products, etc.;

- Assess the safety, environmental sustainability and climate neutrality of circular bio-based processes and products along their value chains, including of the biological feedstock from land and sea used in the production processes. The environmental impacts of processes and products on soil, water, and air quality, biodiversity and climate should be based on existing and validated assessment methods, also developed and improved in past and ongoing R&I projects[304]. In particular, the climate neutrality should be assessed based both on the reduction of greenhouse gas emissions and on the increase of carbon removals and should include an assessment of the energy efficiency improvement;

[304] See, e.g. the project STAR-ProBIO "Sustainability Transition Assessment and Research of Bio-based Products" (H2020 Call 2016 BB-01-2016 Sustainability schemes for the bio-based economy) and the projects developed under the topics HORIZON-CL6-2021-ZEROPOLLUTION-01-05: Environmental sustainability criteria for biological resources production and trade in bio-based systems: impacts and trade-offs and HORIZON-CL6-2023-ZEROPOLLUTION-01-4: Environmental sustainability and circularity criteria for industrial bio-based systems.

- Include the assessment of economic and social aspects of the improved production and consumption bio-based systems in terms of increased economic value along the whole value chains, circular patterns of products involving consumers, i.e., durability, reuse, repair, remanufacturing and recycling patterns, improved economic value of recycled materials, job opportunities, etc.;

- Develop product information systems demonstrating the safe and sustainable use of biological resources and the resource efficiency along value chains, from the production to the extended circular product lifetimes and appropriate disposal. Transparent information should aim at improving the societal acceptance of bio-based innovation and at supporting consumers and customers in making responsible and informed choices.

In order to achieve the expected outcomes, and in line with the EU strategy for international cooperation in research and innovation, international cooperation is encouraged. Projects are expected to contribute to the New European Bauhaus (NEB) initiative by interacting with the NEB Community, NEB Lab and other relevant actions of the NEB initiative through sharing information, best practice, and, where relevant, results.

Where relevant, proposals should seek links with and capitalise on the results of past and ongoing EU funded projects, including under the Circular Bio-based Europe JU, the Processes 4 Planet partnership and other European partnerships of Horizon Europe.

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.

In this topic the integration of the gender dimension (sex and gender analysis) in research and innovation content is not a mandatory requirement.

HORIZON-CL6-2024-CircBio-02-6-two-stage: From silos to diversity – small-scale bio-based demonstration pilots

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	Innovation Actions
Admissibility conditions	The conditions are described in General Annex A. The following exceptions apply: Applicants submitting a proposal under the blind evaluation pilot

	(see General Annex F) must not disclose their organisation names, acronyms, logos, nor names of personnel in 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 following additional eligibility criteria apply: The proposals must use the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.
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: This topic is part of the blind evaluation pilot under which first stage proposals 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: Beneficiaries may provide financial support to third parties. The support to third parties can only be provided in the form of grants. The maximum amount to be granted to each third party is EUR 60 000.

Expected Outcome: This topic supports the bioeconomy strategy and the common agriculture policy (CAP) by promoting new business models for the green transition in line with the European Green Deal objectives.

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

- Demonstration of replicable and scalable, innovative bioeconomy-oriented production and business models with an active involvement of primary producers.
- Enhanced knowledge and awareness on feedstock availability and technology options to better valorise underutilised biomass, residues and waste streams from agriculture and forestry.
- Improved innovation capacities and product portfolio extension in primary production sectors and SMEs.
- Development of new materials, products, and services with considerably lower environmental impacts and at higher value.
- Climate-neutral land sector by 2035 and climate-neutral economy by 2050.

- Diversification and enhancement of agricultural incomes (organic and conventional farming).
- Creation of a stakeholder platform to share best-practice examples and promote new business models in the primary production sectors.
- Promotion of bioeconomy-related interventions in the new CAP and advice and technical guidance for Member States.

Scope: The current economy system is based on an intensive consumption of fossil fuels in a way that severely compromise the future of the planet due to the severe consequences in climate change. Europe's future economic growth and jobs will increasingly have to come from innovation in sustainable products based on renewable resources and in line with the climate and biodiversity objectives. This topic addresses innovative business models and technology options in primary production sectors to unlock the potential of the bioeconomy in rural areas and to efficiently use underutilised biomass, in particular side streams from agriculture and forestry, for high value applications in small-scale bio-based demonstration pilots.

Proposals will:

- Develop new business models for the economic-viable valorisation of local underutilised feedstock, such as by-products, residues, and waste, from land and livestock.
- Demonstrate suitable processes and technologies to produce high-value bio-based materials and products in rural conditions with an active role of primary producers (farmers and foresters) in the value chains.
- Build-upon existing food, feed, or bioenergy value chains to further strengthen their economic and environmental sustainability through synergistic interlinkages and in line with the cascading principle.
- Improve the knowledge on the quantitative and qualitative requirements, harvesting, logistics, pre-treatment (e.g. mechanical, thermal) and conversion of the feedstock.
- Ensure that the bio-based materials and products are based on the latest safety standards.
- Evaluate the environmental and socio-economic performance of the demonstrated value chains.
- Demonstrate the economic feasibility of seeking access to sufficient quantities of raw materials needed to set-up new supply chains and provide evidence that the feedstock streams in question are produced on land that is unsuitable for food production or represent underutilized residues from the agro-food industry.
- Closely interact with other selected projects under this topic and create a joint stakeholder platform to promote best-practice examples for primary producers and SMEs at national and EU-level.

A close cooperation with selected projects from topic HORIZON-CL6-2021-CIRCBIO-01-08 is strongly advised.

Proposals shall apply the concept of the 'multi-actor approach' and ensure adequate involvement of primary producers and other actors active in rural areas.

Proposals may involve financial support to third parties e.g. to primary producers, academic researchers, start-ups, SMEs, and other multidisciplinary actors, to, for instance, develop, test or validate developed applications. Consortia need to define the selection process of organisations, for which financial support may be granted. Maximum 20% of the EU funding can be allocated to this purpose.

Proposals are encouraged to include regions where pilot plants and demonstrational sites are missing or underrepresented.