FTP CALL TOPICS MANUAL HORIZON EUROPE 2021-2022

The complete manual for the Call topics relevant for the forest-based sector

Annex 1

Call topics with Indirect relevance

V2.0 – 21/06/2021

Forest-based Sector
Technology Platform

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Cluster 4: Digital, Industry and Space[1]

Destination 1: Climate neutral, circular and digitised production

Call – Twin green and digital transition 2021

Green, flexible and advanced manufacturing

Topic ID and title	HORIZON-CL4-2021-TWIN-TRANSITION-01-01: AI enhanced robotics systems for smart manufacturing (AI, Data and Robotics – Made in Europe Partnerships) (IA)				
Budget	EUR 28 million	**Opening date**	22 June 2021	**Deadline 1**	23 September 2021
Budget per project	EUR 8 to 10 million			**Deadline 2**	/
Type of action	Innovation Actions (IA)				
FTP subsector	WW, P&P				
Keywords	Modular solutions, Artificial intelligence (AI), open-access pilots, human-machine collaborative systems				
FTP comments					
FTP SIRA 2030 Challenges addressed	6 - 7D,E			**FTP relevance**	Indirect
				Starting TRL	5
				End TRL	7

Expected Outcome:

Projects are expected to contribute to the following outcomes:

- Provide safe, highly flexible, reconfigurable and modular solutions, allowing fast response to repurposing changes in production requirements, reducing considerably programming effort and configuration time for new products;
- Demonstrate significant improvements towards a meaningful and seamless social collaboration in teams of human workers, autonomous agents and robots by exploiting the latest advancements in AI, robotics and Social Sciences and Humanities (SSH);
- Create a network of open-access pilots to allow new users, especially students, start-ups, representatives from the makers' community and SMEs, to experiment new

[1] Work Programme published by the European Commission on 15 June 2021

technologies and to enable data and knowledge sharing through the European industrial ecosystems.

Scope:

EU and Associated countries need to strengthen their capacity to manufacture and re-manufacture goods in a sustainable and competitive way to be ready to expand into new value chains. The recent crisis has also shown the importance of resilient, flexible, reconfigurable and responsive data-driven manufacturing lines.

Projects should seize the opportunities arising from the latest state-of the art-developments in AI and robotics to deploy intelligent and autonomous systems for flexible production.

Research activities should be multi-disciplinary and address all of the following areas:

 Development of robust, easy to use, explainable and compliant AI tools for manufacturing environments that require minimal learning and can be configured without highly skilled personnel;

 Implement and integrate the latest research findings on technologies such as sensors, actuators, control, edge computing, haptic technologies, mechatronics, robotics and autonomous systems to enhance collaborative robotics systems in order to develop advanced smart manufacturing human-machine collaborative systems ensuring safe physical and social interactions and efficient collaboration with human workers;

 Demonstrate complex, safe and efficient collaboration between multiple agents simultaneously, e.g. humans, autonomous agents, industrial machinery, AGVs and collaborative robots;

 SSH should provide a variety of human-centric approaches to develop smooth collaboration in the human-machine teams; to improve user experience; and increase awareness comfort, trust, skill and safety (physical and social) of workers in highly automated industrial environments by incorporating a greater understanding of linguistic, historic, and cultural concerns of end-users and workers , while taking into consideration a gender and intersectional perspective;

 Demonstrate results in at least three large-scale industrial use-cases, targeting sectors and tasks typically difficult to automate.

Proposals submitted under this topic should include a business case and exploitation strategy, as outlined in the introduction to this Destination.

Research must build on existing standards or contribute to standardisation. Interoperability for data sharing should be addressed. Additionally, a strategy for skills development should be presented, associating social partners when relevant.

All projects should build on or seek collaboration with existing projects and develop synergies with other relevant European, national or regional initiatives, funding programmes and platforms.

In order to achieve the expected outcomes, international cooperation is encouraged, in particular with Japan and/or South Korea in view of the long cooperation with EU on AI, robotics and manufacturing.

This topic implements jointly the co-programmed European Partnerships Made in Europe and AI, Data and Robotics.

Destination 2: Increased autonomy in key strategic value chains for resilient industry

Call – A digitised, resource-efficient and resilient industry 2021

Green and Sustainable Materials

Topic ID and title	HORIZON-CL4-2021-RESILIENCE-01-10: Paving the way to an increased share of recycled plastics in added value products (RIA)				
Budget	EUR 23 million	**Opening date**	22 June 2021	**Deadline 1**	23 September 2021
Budget per project	EUR 5 to 7 million			**Deadline 2**	/
Type of action	Research and Innovation Actions (RIA)				
FTP subsector	P&P				
Keywords	Quality of recyclates, recycled content, recyclable-by-design plastics, traceability, additives separation				
FTP comments					
FTP SIRA 2030 Challenges addressed	4 – 6E			**FTP relevance**	Indirect
				Starting TRL	3
				End TRL	6

Expected Outcome:

Circularity and the increase of the content of recycled plastics in value added products are central to the European Strategy for Plastics.

Projects are expected to contribute to several of the following outcomes:

- Establish EU broadly accepted definition of recyclate and develop relevant verification methods for recycled content in products.
- Establish EU broadly accepted procedures to control the consistent quality of recyclates; characterise their suitability for specific applications and trace the recyclates back to their origin;
- Deliver a clear approach to prevent some potentially hazardous substances to enter the recycled plastics system;
- Enhancing ownership and engagement of the society through active collaboration and empowering people and communities as actors of the circular plastic transition.

At medium term, to fulfil the growing demand for recycled plastic content in market products;

- At a longer term, to pave the way toward recyclable-by-design plastics.

Scope:

To allow recycled plastics to be more promptly taken up as raw material for new products there is a need for reliable and standardised procedures to characterise, trace back origin and guarantee the safety of the recyclates. The proposals should address one or more of the following areas:

- Developing standard, robust and easy to use sampling and analysis procedures to ensure consistent recyclate quality and safe products. Develop methodologies to establish the degree of degradation of recycled materials and to foresee their end-of-life;
- Developing and standardising methods for traceability. Allow the identification of origin of recycled materials via digital information management, e.g. marking technologies or blockchain;
- Detect and separate legacy additive in the waste stream, and ensure safe recycling of plastics containing such additives;
- Diffusing innovation, developing overarching best practices and build up communities to stimulate demonstration.

Proposals submitted under this topic should include a business case and exploitation strategy, as outlined in the introduction to this Destination.

Proposals should actively pursue the involvement of all the actors in the value chain from the chemical and material industry, to formulators, recyclers, public authorities and standardisation bodies.

This topic is open for international cooperation where the EU has reciprocal benefit, while excluding industrial competitors from countries where the safeguarding of IPRs cannot be guaranteed.

Materials and data cross-cutting actions

Topic ID and title	HORIZON-CL4-2021-RESILIENCE-01-25: Biomaterials database for Health Applications (CSA)				
Budget	EUR 6 million	**Opening date**	22 June 2021	**Deadline 1**	23 September 2021
Budget per project	EUR 2 to 4 million			**Deadline 2**	/
Type of action	Coordination and Support Actions (CSA)				
FTP subsector	WW, P&P				
Keywords	biocompatibility, biomaterial, Artificial Intelligence (AI), Medical Device				
FTP comments	producers, researchers, users of biocompatible cellulose products, etc. will be interested in following this topic				
FTP SIRA 2030 Challenges addressed	9A,C			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

Projects are expected to contribute to the following outcomes:

- Create of a database of biomaterials, providing detailed information on the chemical-physical, biological and toxicological properties accessible to wide variety of end-users, for e.g. researchers, companies and clinicians for the purposes of evaluating the biological and clinical usefulness also in the areas beyond their intended primary applications.

Scope:

Projects will incorporate data on as many of the material properties as possible, allowing for the development of standardised protocols for the determination and measurement of the efficacy and safety of new biomaterials, taking into account the specificities due to sex, race and age, whether they be single or combination entities. Processing of data should be done in accordance with GDPR provisions.

A label of biocompatibility should be established so as to define the suitability of a biomaterial for eventual use in a Medical Device or Advanced Therapy that the biomaterial becomes a part of, so as to assist companies, especially SMEs, in choosing and facilitating market access for their products.

This database should also contain comparative analyses of the results of biological testing of biomaterials from the scientific literature (and clinical trials, where possible) so as to incorporate data on as many of the material properties as possible, incl. taking into account the specificities defined by sex, race, age. Based upon this, it should be possible to formulate,

as necessary, standardised protocols for the determination and measurement of the efficacy and safety of new biomaterials, facilitating as it will, the need to establish high throughput test platforms in the future for biomaterials, that comprise standardised testing protocols for ex vivo, in vivo, pre-clinical and clinical testing.

Proposals must also address all the areas below:

- Develop a user-friendly platform for making all relevant data easily and readily accessible for the assessment and decision-making processes in appropriate formats to ensure interoperability. To ensure that the data are processed in accordance with the GDPR provisions;
- Facilitate extracting, analysing and re-using of the data with advanced data processing technologies e.g. Artificial Intelligence;
- Provide innovative trainings and manuals for the use of the database and its documentation
- Develop a business model for the maintenance of the database demonstrating its sustainability beyond the funding period. A contribution of SSH expertise in the field of economics and marketing would be beneficial for the achievement of this goal.

Proposals submitted under this topic should include actions designed to facilitate cooperation with other projects, including; relevant ongoing Open Innovation Test Beds76, to enhance user involvement, and to ensure the accessibility and reusability of data produced in the course of the project by agreeing on metadata for the description of the materials databases.

Topic ID and title	HORIZON-CL4-2021-RESILIENCE-01-26: Sustainable Industry Commons (RIA)				
Budget	EUR 6 million	**Opening date**	22 June 2021	**Deadline 1**	23 September 2021
Budget per project	EUR 2 to 4 million			**Deadline 2**	/
Type of action	Research and Innovation Actions (RIA)				
FTP subsector	WW, P&P				
Keywords	Circular economy, data exchange, durability, reusability, recyclability, product reparability, Life Cycle Assessment (LCA)				
FTP comments					
FTP SIRA 2030 Challenges addressed	5 - 9D			**FTP relevance**	Indirect
				Starting TRL	3
				End TRL	6

Expected Outcome:

Data has an enormous economic impact and yet, only a small share of industrial data is retained and used for value creation. European industry needs solutions to mitigate the barriers for industrial data reusability and facilitate the unlocking of value from data, which will make a significant difference to the performance and competitiveness of European industry. At the same time, the efforts to make European industry more competitive and innovative need to be achieved without compromising the future of forthcoming generations, therefore it is also important to provide European industry with tools that aid them in improving their sustainability.

Projects are expected to contribute to the following outcomes:

- Develop tools to support industry in sustainable production and consumption of goods, which assist to improve the overall sustainability performance and contribute to the development of more sustainable solutions by embedding circular economy strategies;
- Develop ontology based data documentation for the application domain to facilitate interconnection by data exchange between designers, manufacturers, users and collectors of used/waste products, applying FAIR data principles and where applicable, taking into account the specificities due to sex, race, age, religion. The data should be processed in accordance with GDPR provisions;
- Reinforce European industry capacities and adapt to the new trends in the areas of sustainability and digitalization, and contribute to the development and/or creation of standards;

- Increase competences for data handling among the potential data users (e.g. by providing trainings);
- Ensure high visibility of project results and user-friendly, open access to data and ontologies.

Scope:

To develop tools for industry to enhance efficiency and contributing to less waste and emissions while improving material/product/process quality all along the lifecycle of a product/service system. The proposals should have a holistic approach, with a minimum of three demonstrators/use-cases, covering the entire material/product/process life cycle and proving the interoperability of data across the life cycle stages across industry domains. The developed tools have to be compliant with existing standards, and the proposals should contribute to development and/or creation of new ones.

The developed tools have to address circular economy strategies (as for example improvement of durability, reusability, recyclability, recycled content, product reparability, etc.) in order to guide companies to the development of their sustainability agendas with an effective and user-friendly interface. Improvement of the overall environmental performance should be demonstrated applying Life Cycle Assessment.

The developed tools have to be semantically interoperable and associated application domain ontologies and data format have to be built upon the emerging developments of the Industry Commons projects of H2020. Actions designed to facilitate cooperation with other projects, to enhance user involvement and to ensure the accessibility and reusability of data produced in the course of the project should be addressed, for example with EOSC-based initiatives and European Data Spaces.

Call – A digitised, resource-efficient and resilient industry 2022

Materials and data cross-cutting actions

Topic ID and title	HORIZON-CL4-2022-RESILIENCE-01-25: Optimised Industrial Systems and Lines through digitalisation (IA)				
Budget	EUR 15 million	**Opening date**	12 October 2021	**Deadline 1**	30 March 2022
Budget per project	EUR 4 to 5 million			**Deadline 2**	/
Type of action	Innovation Actions (IA)				
FTP subsector	WW, P&P				
Keywords	Industrial digitalisation, Artificial Intelligence (AI), process efficiency, product quality, digital tools, Life Cycle Assessment (LCA), MODA, CHADA, EMMO				
FTP comments					
FTP SIRA 2030 Challenges addressed	6			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	6

Expected Outcome:

The digital transformation of the European manufacturing industry depends on the availability and uptake of high quality, efficient, affordable and optimised systems, such as those offered by cloud infrastructures, simulation-based twin technologies, data driven approaches. However, there is a low uptake in Europe for such technologies, for example in the case of cloud computing only 1 company in 4 apply it and only 1 in 5 for SMEs105.

Projects are expected to contribute to the following outcomes:

- Support the transition towards industrial digitalisation;
- Increase speed of innovation by optimising the use of existing research results and facilitating uptake of new projects results;
- Design digital tools for industry (e.g. cloud systems, simulation-based twin technologies, data driven approaches, AI-based and reinforcement learning solutions) to enhance efficiency and product quality, as well as to increase the capability for better and faster reaction to market changes;
- Contribute to the development of advanced material modelling solutions in particular for manufacturing industry;
- Enhance data interoperability and new type of services related to the data analysis, simulations and/or visualisation techniques in each stage of the material value chain (design, processing, manufacturing, etc.) using FAIR data principles.

Scope:

Digital tools can enable industry to control manufacturing processes and address issues more efficiently and effectively as they run and update the production plant, while improving key product and production performance indicators such as yield and throughput.

Proposals under this topic have to

- design robust digital tools integrating materials modelling and materials process development for industry;
- promote use and adaptation of existing tools and process developments that are applicable to different sectors;
- contribute also to the development of simulation and optimisation methods to facilitate more efficient design space exploration via experimentation, thereby reducing physical testing and improving quality;
- enhance efficiency of the manufacturing process;
- improve process and product quality
- improve decision making efficiency, quality and understanding, while at the same time maintaining low operational costs.

Interconnection between processes and other industries is also in the scope, as there is an increased integration of different domains and disciplines in complex workflows. To overcome the problem, proposals have to address interoperability by implementing available data standards like MODA, CHADA and ontologies like EMMO, as well as cooperation with the Industry Commons developments.

The proposed use cases for the developed tool should demonstrate the business case and how more sustainable solutions are achieved in the market, for example by reducing waste and/or emissions during production. A Life Cycle Assessment should be included to estimate the environmental improvement, together with a Life Cycle Cost assessment to demonstrate the lower operational costs.

Proposals submitted under this topic should include a business case and exploitation strategy, as outlined in the introduction to this Destination.

Destination 4: Digital and emerging technologies for competitiveness and fit for the Green Deal

Call – Digital and emerging technologies for competitiveness and fit for the Green Deal 2021

European leadership in Emerging Enabling Technologies

Topic ID and title	HORIZON-CL4-2021-DIGITAL-EMERGING-01-13: Academia-Industry Forum on Emerging Enabling Technologies (CSA)				
Budget	EUR 2,5 million	**Opening date**	22 June 2021	**Deadline 1**	21 October 2021
Budget per project	EUR 2,5 million			**Deadline 2**	/
Type of action	Coordination and Support Actions (CSA)				
FTP subsector	F&F, WW, P&P				
Keywords	Bio-enabled technologies, sustainable smart materials, innovation ecosystem, local contexts				
FTP comments	This is really about creating a platform for discussions between industry and academia. It is topic agnostic.				
FTP SIRA 2030 Challenges addressed				**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

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

- European thought leadership in academia and industry on future enabling technologies and their transformational potential in industrial, societal and environmental terms.
- Increased engagement for structural collaboration and co-creation between academic, industry players and other stakeholders where roles of research, industry and society intertwine in an iterative and multidisciplinary approach for co-creating the enabling technologies of the future, all the way from low to higher TRLs, such as (but not limited to) bio-enabled technologies, sustainable smart materials and alternative computing models
- Alignment with national or regional initiatives creating an expanding innovation ecosystem, anchored in local contexts across Europe, for selected emerging technologies.
- Accelerating the pick-up of novel advanced technology by industry and society.

Scope:

A Coordination and Support Action to create and catalyse a forum for emerging interdisciplinary areas and new technological visions. These actions enable and support a broad range of participants (across disciplines in science and engineering, RTOs, industry sectors, stakeholders) to meet, mutually inspire, cooperate and develop together innovative ideas for future enabling technologies from early stages on (i.e., TRL 3+). They will help industry to navigate rapidly changing environments, for instance by actively transferring ideas and early technologies between players that would not normally interact, or by combinations of different foresight activities (short-term, long-term, cross-sectorial) to prioritise strategic directions while avoiding narrow visions for the future.

Concrete activities will include horizon scanning, portfolio analysis, a variety of participatory workshops, visibility in various meetings, high-profile reporting on emerging enabling technologies. This will build on (and link to) existing programmes and research portfolios from European and national/regional programmes (including at low TRL) as well as broad sourcing from foresight and technology scouting activities, including those specifically done by this action for the cluster 4 industries and sectors. The forum should link to existing initiatives and partnerships and add value by active cross-fertilisation across disciplines and sectors, and by breaking the model of linear progression of technology development. National or regional R&I priorities and orientations from European countries will be taken into consideration. Broader stakeholder engagement is expected.

The forum should become a reference for new enabling technologies at different levels of maturity, their purpose, their transformational pathways and their impacts with a distinctive anchoring in European industry and research, as well as providing guidance and reasoned alternatives for Europe's transformations, in line with the Commission priorities (in particular, Green Deal, Digitisation, and Industrial Strategy).

Proposals should involve and be driven by representatives of the relevant actors of the field (e.g., academia, RTOs, industry including SMEs).

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

Topic ID and title	HORIZON-CL4-2021-DIGITAL-EMERGING-01-27: Development of technologies/devices for bio-intelligent manufacturing (RIA)				
Budget	EUR 22,5 million	**Opening date**	22 June 2021	**Deadline 1**	21 October 2021
Budget per project	EUR 5 to 7 million			**Deadline 2**	/
Type of action	Research and Innovation Actions (RIA)				
FTP subsector	P&P				
Keywords	Industrial biological transformation, biological components, digital technologies, interdisciplinary collaborations, nanotechnology, biosensors, bioactuators, Big Data, Digital Twins, Artificial Intelligence (AI)				
FTP comments					
FTP SIRA 2030 Challenges addressed	5 - 6B,C - 9B - 10A,B			**FTP relevance**	Indirect
				Starting TRL	2
				End TRL	4

Expected Outcome:

The use of biological elements as key enabling technology for manufacturing is an emerging trend that perfectly concurs with the pressing requirements of sustainability.

Biological transformation of industry can harness innovative and more efficient modes of production which can satisfy the needs of future generations.

Proposals are expected to contribute to the following outcomes:

- Strengthening European leadership in bio-intelligent manufacturing to support the industrial biological transformation;
- Developing of key enabling technologies which use biological components (and data) with an interface to a technical system making decisions, or a biological system with intrinsic intelligence for technical applications in manufacturing – in best case with a bi-directional communication between the biological and the technical system;
- Mainstreaming the integration of biological principles, functions and structures with other technologies – including digital – leading to novel, more efficient, manufacturing processes and methods;
- Facilitating extensive interdisciplinary collaborations and knowledge transfer among different disciplines such as bio engineering, biology, industrial manufacturing and Social Science and Humanities.

Scope:

In a context of increasing constrains in the usage and production of resources, bio-intelligent technologies should arise as key enabling manufacturing systems under any circumstances

while fostering the biological transformation of industry. In this sense, research activities should be highly multi-disciplinary and networked to the strengthening of European industrial leadership and autonomy in this emerging technology.

Proposals should investigate the potential of bioenabled technologies through the integration of biological principles with other technologies, to bolster future supply chains and more efficient manufacturing.

Proposals should aid the biological transformation of industries, investigating the biological-technical interfaces of industrial and technological applications.

Research activities under this topic should cover (but not be limited to):

- Biomimicry of biological mechanisms to enable discrete manufacturing;
- Development of bioinspired systems and materials with technological and data interactions;
- Innovative metrology and characterisation required for development of the bio-inspired technical components and systems;
- Exploring potential synergies between nano- and biotechnology in production technologies;
- Biosensors and bioactuators as enablers of novel manufacturing techniques, building on bi-directional communication between a biological and technical systems to aid discrete manufacturing;
- The use of biological components to increase efficiency in controlled manufacturing processes.
- Innovative metrology and characterisation required for development of the bio-inspired technical components and systems

Proposals should investigate the use of Big Data as a key enabler of the bio-technological transformation in manufacturing.

Proposals should explore the use of data processing, Digital Twins and AI integrating data exchanging between biological systems to technical components for the discrete manufacturing environment.

Research activities should also cover societal and business challenges associated with biointelligent manufacturing.

Call – Digital and emerging technologies for competitiveness and fit for the Green Deal 2022

European leadership in Emerging Enabling Technologies

Topic ID and title	HORIZON-CL4-2022-DIGITAL-EMERGING-01-35: Advanced characterisation methodologies to assess and predict the health and environmental risks of nanomaterials (RIA)				
Budget	EUR 17,5 million	**Opening date**	23 November 2021	**Deadline 1**	05 April 2022
Budget per project	EUR 2 to 3 million			**Deadline 2**	/
Type of action	Research and Innovation Actions (RIA)				
FTP subsector	P&P				
Keywords	High-resolution imaging, nanomaterials, nanoplastics, nanotoxicology, biodegradability, Life Cycle Assessment (LCA), in vitro models				
FTP comments					
FTP SIRA 2030 Challenges addressed	9			**FTP relevance**	Indirect
				Starting TRL	3
				End TRL	5

Expected Outcome:

The development of reliable and practical tools to ensure the safe and sustainable use of nanomaterials has not kept pace with the rapid commercialization of nanotechnology-enabled products. The dynamic nature of many nanomaterials in complex environmental matrices is recognized as a major challenge for their detection, quantification and characterization. Consequently, there is an urgent need to establish appropriate methods for cost-efficient assessment and prediction of the health and environmental effects of nanomaterials, providing better decision criteria, based on quantitative rather than qualitative information and taking into account the full life cycle of a material. Proposal results are expected to contribute to several of the following expected outcomes:

- Develop high-resolution imaging methods for quantification and characterization of nanomaterials (e.g. nanoplastics) in complex matrices and determinations of their transformations in such environments
- Increase availability of validated protocols to advance both nanosafety studies and material characterization.
- Ensure appropriate control experiments and more realistic in vitro models to address current gaps in nanotoxicology.

- Deliver reliable data and improved data reporting guidelines, supported by computational modelling, in order to allow the development of grouping and read across methods. Make use of open access database and using standards for data documentation (e.g. CHADA).
- Develop harmonized standardized test methods that can be used in a regulatory framework including test hazard assessment, biodegradability and sustainability for advanced nanomaterials.
- Increase the efficiency and effectiveness of materials and product development by reducing costs and time for product design, time-to-market and regulatory compliance

Scope:

- Develop advanced characterization tools and methods for nanomaterials industry to enhance the design and development stages of advanced materials and products contributing to less waste and emissions while improving process quality in line with Life Cycle Assessment framework
- Develop new in vitro models and tests to assess nanotoxicology;
- Include use cases to validate and demonstrate the approach(es) in industrial settings and involve comprehensive analysis and measurement of process and handling release scenarios and exposure measurements;
- Propose the validated methods to standardization bodies such as ISO or OECD for development of standards, test guidance or a guidance document;
- Demonstrate connectivity with H2020 nanosafety projects and leverage the extensive experience from relevant initiatives. Cooperation with EU funded projects under Industry Commons and other similar initiatives for interoperability and data documentation should be addressed;

In line with the Union's strategy for international cooperation in research and innovation, international cooperation is encouraged.

Call – Digital and emerging technologies for competitiveness and fit for the Green Deal 2022

Graphene: Europe in the lead

Topic ID and title	HORIZON-CL4-2022-DIGITAL-EMERGING-02-20: 2D-material-based composites, coatings and foams (IA)				
Budget	EUR 9 million	**Opening date**	16 January 2022	**Deadline 1**	16 November 2022
Budget per project	EUR 9 million			**Deadline 2**	/
Type of action	Innovation Actions (IA)				
FTP subsector	P&P				
Keywords	Energy consumption reduction, recyclable composites, recyclable coatings, high temperature performance, batteries, hydrogen storage, Life Cycle Assessment (LCA), end-of-life (EOL)				
FTP comments	Graphene, carbon firbres, nanocellulose, paper, gels could be interesting here or in 01-19 2D materials-based devices and systems for biomedical applications (RIA)				
FTP SIRA 2030 Challenges addressed	9A,C,D - 10B			**FTP relevance**	Indirect
				Starting TRL	4-5
				End TRL	6-7

Expected Outcome:

Proposal results are expected to contribute to the following outcomes:

- new multifunctional recyclable materials enabling solutions to environmental challenges.

Scope:

Proposals should address 2D materials (2DM) composites, aero-gels and foams that can bring the full nanoscopic functionality of 2DM from nano- and microscale into the macroscopic world. They should target in particular the development of 2D materials and technologies mainly addressing environmental issues including e.g. energy consumption reduction in transport, oil spill removal from water, water purification with low energy consumption and improved water desalination. They should also target the development of next generation, lightweight, recyclable composites and coatings endowed with key functionalities like e.g., high temperature performance, structural health monitoring, and as enablers for, e.g., structural batteries or hydrogen storage. They should also address Metal-

2DM composites enabling ultralow friction surfaces, reducing energy loss in sliding mechanical and electrical parts and the development of 2DM foams enabling hydrogen

economy through catalytic hydrogen generation and storage. Proposals should also integrate the value chain and incorporate the relevant manufacturing technologies necessary to bring the developed devices towards the market.

Proposals must implement from the very beginning life cycle assessment (LCA) and end-of-life (EOL) materials management to fully capture the advantage and develop greener materials and processes.

Proposals should include activities aiming at facilitating future exploitation of results.

Proposals should aim at demonstrating by the end of the project fully functional material systems and prototype applications operating in relevant environment conditions (TRL 6-7).

The proposal should also cover the contribution to the governance and overall coordination of the Graphene Flagship initiative.

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

Destination 6: A human-centred and ethical development of digital and industrial technologies

Call – A human-centred and ethical development of digital and industrial technologies 2021

Systemic approaches to make the most of the technologies within society and industry

Topic ID and title	HORIZON-CL4-2021-HUMAN-01-18: Fostering standardisation to boost European industry's competitiveness (CSA)				
Budget	EUR 1 million	**Opening date**	22 June 2021	**Deadline 1**	21 October 2021
Budget per project	EUR 1 million			**Deadline 2**	/
Type of action	Coordination and Support Actions (CSA)				
FTP subsector	F&F, WW, P&P				
Keywords	innovative solutions, climate change, digitalisation, agile standards				
FTP comments					
FTP SIRA 2030 Challenges addressed	Cross-sectional			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

Proposals are expected to contribute to the following outcomes:

- Reinforcing the links between research, innovation and standardisation ensuring that standardisation is an integral part of the European research and innovation landscape.
- Facilitating the entry to market of innovative solutions, which could address major societal challenges such as climate change and digitalisation.
- Promoting standardisation as an important enabler towards the enhancement of the competitive edge of the European industry.
- Helping in the development of agile standards by identifying the major bottlenecks of the standard-setting process.

Scope:

As emphasised in the European Green Deal and in the New Industrial Strategy for Europe, developing new standards, coupled with increased EU participation in international standardisation bodies, will be essential to boost industry's competitiveness and build a sustainable and more inclusive future.

This action will identify obstacles hampering standardisation efforts of research generators, develop remedies to the obstacles, and propose solutions to foster standardisation as a means of knowledge valorisation by engaging with relevant standardisation bodies.

The action will create an interface to facilitate networking between the beneficiaries and their national, European, international standardisation bodies for the exploitation and valorisation of EU funded research results, organise trend analysis workshops, and promote the discussion between R&I and standardisation. This interface will be a one-stop-shop for all these related matters.

Topic ID and title	HORIZON-CL4-2021-HUMAN-01-19: Testing innovative solutions on local communities'-demand (CSA)				
Budget	EUR 5 million	**Opening date**	22 June 2021	**Deadline 1**	21 October 2021
Budget per project	EUR 5 million			**Deadline 2**	/
Type of action	Coordination and Support Actions (CSA)				
FTP subsector	F&F				
Keywords	societal needs, societal solutions, co-creation, cities, local communities				
FTP comments					
FTP SIRA 2030 Challenges addressed	1E - 3A,D,E			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

Proposals are expected to contribute to the following outcomes:

- Increased societal uptake of new technologies and knowledge-based solutions, achieved through better understanding of societal needs and higher societal acceptance;
- Increased place-based innovation and experimentation, through testing of up to 100 innovative new solutions in partnership with cities and local communities, research and industry, drawing on local characteristics and strengths;
- Increased innovation capacity across Europe, through new models of co-creation and exchange of good practises and learning from experimentation, so that innovative solutions are shared and adapted to the needs of local communities (avoiding 'one size fits all').

Scope:

This action will promote the uptake of research-based technological and non-technological solutions in cities and local communities by responding to concrete, citizen driven, demand for testing and experimentation. By addressing the local societal demand for innovative solutions and bringing forward R&I to match communities' needs, the action will contribute to implementing the European Green Deal's aim "to involve local communities in working towards a more sustainable future, in initiatives that seek to combine societal pull and technology push". By matching needs to (candidate) new solutions stemming from EU R&I, and testing these solutions in a transparent and socially inclusive way, the action will

contribute to technology uptake with citizen engagement, in line with the aims of the European industrial strategy.

Within the scope of this action is to co-create and test societal solutions, so that R&I developed in Europe can be tested in Europe, jointly with local communities. The scaling up of the effective solutions is not within the scope of this action, and could be facilitated through other programmes and initiatives (public and/or private). The core concept lies in collecting, and then matching, needs of cities and communities with supply of possible solutions from research results, involving adaptation to local needs, testing in real environments (cities/communities as testbeds) and ensuring benefits for all parts of society.

Main beneficiaries of this action will be the participating cities and local communities, together with the research and business partners involved in the testing and further uptake of the innovative solutions. The action may engage planners, designers, architects, artists, climate scientists, policy makers, investors, social innovators, local professionals and small businesses. It will draw on the diversity of the local environments and their needs and concepts for societal transformations and facilitate the sharing of experiences and lessons learned. The consortium may provide financial support to third parties. The maximum amount to be granted to each third party is EUR 60 000. The respective options of the Model Grant Agreement will be applied.

Topic ID and title	HORIZON-CL4-2021-HUMAN-01-21: Art-driven use experiments and design (RIA)				
Budget	EUR 8,5 million	**Opening date**	15 April 2021	**Deadline 1**	21 October 2021
Budget per project	EUR 2,8 million			**Deadline 2**	/
Type of action	Research and Innovation Actions (RIA)				
FTP subsector	WW, P&P				
Keywords	industry-artist collaboration, R&D projects, digital technologies, green manufacturing, social, business and sustainability challenges				
FTP comments					
FTP SIRA 2030 Challenges addressed	Cross-sectional			**FTP relevance**	Indirect
				Starting TRL	3
				End TRL	5

Expected Outcome:

Dedicated collaboration of industry with artists in R&D projects will lead to novel products and services in line with a human-centred approach to innovation and with sustainability goals. Proposals should bring together artistic practices with the technological expertise provided by the consortium. This will:

- Stimulate uptake of digital technologies across selected sectors - (Green) Manufacturing, Mobility/Urbanism, Health, Agriculture, Energy and Space through art-driven experimentations to address social, business or sustainability challenges in the chosen sector(s).
- Increase trust in and acceptance of digital technologies in society through art-driven design and development of digital technologies. The development process and system behaviour of the technologies should explicitly acknowledge human values and needs and thereby enable social inclusion and environmentally friendly innovation.

Scope:

Design of technology and deployment in selected sectors will be explored through use cases between stakeholders in industry – engineers, developers –, end-users and artists though dedicated industrial projects in continuation of the S+T+ARTS residencies and S+T+ARTS lighthouse pilots282. The role of the arts will be to (i) conceive challenging human-centred use scenarios, (ii) explore alternative design methods and use scenarios for technologies using artistic practice. Artists are contributing in system design and system testing and by allowing exploration of technology in an artistic context. The call addresses all digital technologies but in particular Artificial Intelligence. Calls will be open to research and

technology institutions, companies, and SMEs willing to provide access to selected (digital) technologies and to connect to the arts.

The consortium will provide technical support and access to a range of digital technologies for art-driven experimentation and support via financial support to third-parties for art-driven experimentation. The support to third parties can only be provided in the form of grants to: (a) artists interested to explore and to work with technologies to enhance their usability and uptake and (b) artists and end-users/providers of novel technologies collaborating in art-driven experiments. Third parties will be funded through projects typically up to EUR 40 000 per project for type (a) and EUR 80 000 per project for type (b) (30% of which to artists). At least EUR 400 000 of the requested EU contribution should be dedicated to financial support to third parties of type (a) and at least EUR 800 000 to type (b).

Topic ID and title	HORIZON-CL4-2021-HUMAN-01-26: Workforce skills for industry 5.0 (RIA)				
Budget	EUR 5 million	**Opening date**	22 June 2021	**Deadline 1**	21 October 2021
Budget per project	EUR 5 million			**Deadline 2**	/
Type of action	Research and Innovation Actions (RIA)				
FTP subsector	F&F, WW, P&P				
Keywords	nature of job transformation, 4th industrial revolution, future skill requirements, new learning and training systems, social sciences and humanities (SSH), insights of industry leaders, job nature and skills, labour productivity, employment and mobility, business value chains, organisational models				
FTP comments					
FTP SIRA 2030 Challenges addressed	7			**FTP relevance**	Indirect
				Starting TRL	4
				End TRL	6

Expected Outcome:

Proposals are expected to contribute to the following outcomes:

- A quantitative and qualitative assessment of the nature of job transformations in the context of the 4th industrial revolution, estimating and mapping the emerging occupations. Establishment of an "Industry 5.0 platform" for future skill requirements improving the critical understanding of the 'black box' of new jobs creation;
- guidance and recommendations, including avenues for new learning and training systems, for policy-makers, businesses, individuals, to reduce the skills' gaps, to cope with possible unemployment effects, to foster industrial competitiveness while enhancing inclusiveness.

Scope:

The 4th industrial revolution, has been associated with production efficiencies, cost reductions, streamlined labour requirements and business model adaptations. However, this is accompanied with social, economic and organizational challenges such income inequalities, public perception for job quality and scarcity, legal issues and data security. The RIA will investigate the social and economic impacts generated by emerging disruptive technologies (artificial intelligence & machine learning, block chain, big data, internet of things, 5g, etc.), robotisation and digitalization on labour markets and business models. They will explore innovative methodologies in redefining work activities and automatable tasks also through an historical comparison with previous industrial revolutions, including cultural, ethical, and regional perspectives, combining the tools of social sciences and humanities

(SSH) disciplines with the insights of industry leaders (large companies, SMEs, regional ecosystems) and social partners. Several dimensions should be explored: job nature and skills including the impact generated by the covid-19 outbreak, labour productivity, employment and mobility, quality and new forms of work, business value chains, management and organisational models, gender aspects, workplace and socio-demographic characteristics, territorial structures. Proposals will comprehensively assess how benefits are distributed in all sectors and, keeping into account similar ongoing exercises (e.g. OECD, CEdefop, etc..) as well as national industry 5.0 initiatives, they will forecast the expected dominant trend of jobs, mapping the emerging occupations and predicting the future skill needs and shifts by industry, also improving the critical understanding of those which cannot be automated (creativity, social intelligence, problem-solving, etc..).

Furthermore distinctive learning trajectories and training paths will be identified for both STEM and soft skills, including combined public-private learning ecosystems and collaborative learning techniques/tools. Skills taxonomies will be developed in order to monitor track changes in the demand that are continually challenged by technological progress, thus contributing to close unintended skill gaps and unemployment spill-overs.

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.

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.

Cluster 5: Climate, Energy and Mobility[2]

Destination 1: Climate sciences and responses for the transformation towards climate neutrality

Call – Climate sciences and responses 2021

Topic ID and title	HORIZON-CL5-2021-D1-01-02: Modelling the role of the circular economy for climate change mitigation				
Budget	EUR 15 million	**Opening date**	24 June 2021	**Deadline 1**	14 September 2021
Budget per project	EUR 5 million			**Deadline 2**	/
Type of action	Research and Innovation Actions (RIA)				
FTP subsector	Climate change				
Keywords	global climate mitigation models, industrial value chains, mitigation technologies, GHG emission reduction				
FTP comments					
FTP SIRA 2030 Challenges addressed	1 - 4			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

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

- Improve existing European and/or global climate mitigation models by better representation of basic industrial value chains (including reliable data) and potential mitigation technologies including the impact of circular economy.
- Improve the quantification of the impacts and potentials of the circular economy for climate change mitigation.
- Support the integration of the circular economy into climate action, policies and their evidence base, including externalities.
- Support the integration of the GHG emission reduction / mitigation in the circular economy criteria.

[2] Work Programme published by the European Commission on 15 June 2021

Scope:

Projects are to advance the understanding and modelling of the current and future potential contribution of the circular economy in Europe to GHG emissions reductions. The scope of the modelling activities has to go beyond the state-of-the-art, in particular in terms of sectors covered and their interrelations, be as comprehensive as possible (e.g. covering also the blue economy), and include citizen's behaviours and engagement.

This action should look beyond the specific measures needed to deliver a circular economy and propose a framework for revealing, demonstrating and quantifying the circular economy's potential contribution to climate goals, as well as improving the coverage of basic industry value and supply chains in models (or suites of models) used to analyse mitigation pathways. While focusing on the linkages between circular economy measures and climate goals, the action can also improve the understanding of the connections between climate action and other environmental areas and issues as well as social and health issues, in line with the systemic approach that the European Green Deal promotes.

Collaboration between the scientific community and policy- and decision-makers in order to integrate the circular economy into integrated assessment frameworks and other comprehensive climate policy visions is highly recommended. Actions should also ensure collaboration with industry stakeholders and civil society, including, for example, sharing best-practices, data, models and other knowledge required to analyse mitigation pathways to ensure the input of - and alignment with - the needs, values and expectations of society.

When dealing with models, actions should promote the highest standards of transparency and openness, as much as possible going well beyond documentation and extending to aspects

such as assumptions, code and data that is managed in compliance with the FAIR principles21. In particular, beneficiaries are strongly encouraged to publish results data in open access databases and/or as annexes to publications. In addition, full openness of any new modules, models or tools developed from scratch or substantially improved with the use of EU funding is expected.

Topic ID and title	HORIZON-CL5-2021-D1-01-03: Maximising the impact and synergy of European climate change research and innovation				
Budget	EUR 9 million	**Opening date**	24 June 2021	**Deadline 1**	14 September 2021
Budget per project	EUR 4 to 5 million			**Deadline 2**	/
Type of action	Coordination and Support Actions (CSA)				
FTP subsector	Climate change				
Keywords	communication of science-based information, EU-funded climate change research projects				
FTP comments					
FTP SIRA 2030 Challenges addressed	1E			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

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

- Raising awareness of citizens, business, social partners, policy-makers and other relevant audiences towards climate change, based on more efficient, transparent and engaging communication of authoritative and timely science-based information originating from EU-funded climate change research projects.
- Better coordination of both on-going and future EU-funded climate change research initiatives and a more efficient use of resources.
- Enhanced impact of research investments and accelerated transfer of knowledge to inform policy and climate actions in Europe.
- Increased robustness, coherence and visibility of the results of EU-funded climate change research and innovation leading to increased uptake of the knowledge and solutions and more robust decisions by the public sector, businesses, industry and society.
- Curation of research and innovation project results related to climate change, such that stakeholders can discover and understand what EU-funded research is ongoing in their area of interest.
- Innovative and tailor-made tools and strategies to communicate the results of EU-climate change research leading to improved science – civil society interface, while considering drivers for active citizen engagement in climate action and more sustainable behaviours, including social innovations.

- Better coordination of climate change research, innovation and technology initiatives within the European Research Area, facilitating complementarity and coherence between EU-level, national and regional efforts and a more efficient use of resources.
- Identification of complementary research and innovation activities among the past, present and future work supported by national and regional R&I programmes on climate change, facilitating coherence between EU-level and national efforts and a more efficient use of resources, and taking into account international developments where relevant.
- Showcasing national and regional research and innovation activities and findings that could be of interest for cooperation between countries.
- Improving prioritisation of European climate change research by identifying priority topics (in terms of knowledge gaps and/or societal needs), and taking stock of national and EU-level climate change R&I research activities, in order to enhance the ability of existing and future European R&I to respond to societal needs.
- Accelerating the transfer of knowledge on climate change research to policy-makers, practitioners and the society.
- Implementation of collaborative activities to enhance the market, regulatory or societal uptake of R&I solutions related to climate change across Europe, for example by replicating national or local success stories in Europe.
- Identify good practices at European, national and regional level on communication, dissemination and exploitation of climate change research findings and projects results and facilitate their scaling up.

Scope:

Actions should cover one of the following areas:

a) Maximising the impact of EU-funded climate change research

The action should deliver effective mechanisms to strengthen the science-policy and science-civil society interface on the state-of-the-art climate change research in order to increase Europe's capacity to accelerate the response to the climate crisis and, biodiversity and other environmental challenges. Climate change research is understood here as projects dealing with climate, mitigation and adaptation science that will result mainly from Destination 1 of Cluster 5 - “Climate sciences and responses”- of Horizon Europe as well as relevant legacy projects of Horizon 202022. Other relevant projects, in particular from Cluster 3 and 6, as well as other Destinations in Cluster 5 should also be considered where relevant and

possible. Synergies with the topic HORIZON-CL5-2021-D1-01-06: Supporting and standardising climate services should be established as necessary.

Knowledge synthesis and valorisation of results across EU funded projects and initiatives are expected to constitute an important element of work and should lead to integrated policy briefs and (joint) scientific publications that consolidate findings from different projects on priority issues and challenges that are central to climate action at all scales. To deliver these objectives, the action should consider activities such as curating, clustering, co-ordinating and supporting the creation of synergies between EU-funded climate change research and innovation activities, where relevant also considering national as well as international initiatives such as Global Covenant of Mayors and Mission Innovation.

The actions should identify and systematically update research needs emerging from science and/or policy discussions, and, where possible, match these needs against the themes that are addressed (or could be addressed) by ongoing EU-funded research projects.

The action should build on the knowledge and tools accumulated during previous and existing EU-funded initiatives. It should provide for adequate resources to take over and manage selected knowledge curation platforms, including the EU climate change mitigation portal23. It is also expected to facilitate exploitation and maintenance of selected decision support tools developed by other EU-funded climate change research projects in close cooperation with the Commission services.

Communication, dissemination and cross-fertilisation of research results will be an important component of the action and should include support to upscaling the efforts of individual projects under Destination 1. These activities are expected to account for the majority of the action's budget and should be accordingly substantiated in the proposal. Activities should go beyond standard (passive) practices and could include, for example, Massive Online Open Courses, videos, mobile apps, festivals, citizen debates and other forms of active outreach, where possible and appropriate building on existing tools and materials developed by EU-funded projects. They should address a broad range of audiences, including policy makers, business and civil society with particular emphasis on young people, taking into account each audience's specific needs and paying attention to gender differences, with a view to increase awareness about the state of climate science, build support for climate action and trigger broader societal transformation. National, regional and local level initiatives should be an important component of the outreach. Innovative approaches, such as, for example, UNEP's "Earth School"24, podcasts or TED talks25, fully leveraging digital and social media opportunities, are strongly encouraged. The action should

mobilise and promote direct interaction between the scientific community and civil society/practitioners. In addition, it should also support efforts to counter misconceptions, fake news and conspiracy theories regarding climate change.

The action is also expected to contribute to the objectives and activities of the European Climate Pact26.

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, notably as regards exploration of the most effective techniques of communication, dissemination and engagement, in order to produce meaningful and significant effects enhancing the societal impact of the related research activities. Social innovations should also be considered, notably as new tools, ideas and methods leading to active citizen engagement and as drivers of social change, social ownership and new social practices.

b) Maximising the synergy of climate change research and innovation in Europe

This action will help strengthen the European Research Area by ensuring coordination, cooperation and synergies between research, innovation and technology policies and programmes in the area of climate change research, including mitigation and adaptation, at European, national and regional level.

Maximising the societal impact of climate change research in Europe requires coordination among European, national and regional initiatives and research programmes. For example, climate services, mitigation and adaptation options pioneered in one location may be deployable in another. In basic climate science, coordination among programmes avoids duplications, and ensures optimal use of resources (like IT infrastructure or data).

The action is expected to help prioritise investments in climate change R&I and to add value to current and future R&I occurring across the ERA by exploiting potential synergies in R&I planning and activities, and opportunities for partnerships or complementary activities. To achieve this objective, the action should facilitate dialogue and exchange of information among the relevant scientific communities and funding bodies at European, national and regional level. It should identify and systematically update research needs emerging from science, policy discussions and the society, and enable the inclusion of these priorities in national and regional research strategies and agendas to finance ongoing and future projects.

A science-policy and science-society dialogue should be established, when possible in coordination with similar initiatives organised by other projects or entities, to improve access to and communication and dissemination of excellent climate change research and innovation. Activities will enhance cooperation between climate research scientist, professionals and all relevant stakeholders (e.g. universities, business and other research and innovation actors), accelerate the transfer of knowledge to inform policy and climate actions in Europe.

Activities should identify, analyse and support the scaling up of good practices at European, national and regional level on communication, dissemination and exploitation of climate change R&I projects results and solutions, as well as on climate change policies and strategies (e.g. comparative reports on national and regional R&I policies addressing climate change).

The scope should include the organisation of the European Climate Change Adaptation (ECCA) Conferences and contribution to other international conferences on climate change adaptation.

Coordination should be ensured with relevant European, national and regional initiatives (e.g. Joint Programming Initiatives, EIT Climate-KIC…).

The activities should build links with relevant EU programmes such as Copernicus, as well as build upon and link to global structures like the IPCC, the Global Carbon Project and the Global Covenant of Mayors.

Projects funded under this topic should ensure coordination between their activities.

Topic ID and title	HORIZON-CL5-2021-D1-01-04: Enhanced integrated assessment in pursuit of global climate goals				
Budget	EUR 15 million	**Opening date**	24 June 2021	**Deadline 1**	14 September 2021
Budget per project	EUR 5 million			**Deadline 2**	/
Type of action	Research and Innovation Actions (RIA)				
FTP subsector	Climate change				
Keywords	climate policies, national planning, post-2030 period, Paris Agreement goals, international cooperation, Integrated Assessment Models (IAMs), energy, industry, land use, best practices, social sciences and humanities (SSH), Nationally Determined Contributions (NDCs)				
FTP comments					
FTP SIRA 2030 Challenges addressed	1			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

Under the Paris Agreement, Parties to the UNFCCC have to pursue policies and measures to reduce their greenhouse gas emissions, including by preparing and implementing successive Nationally Determined Contributions (NDCs) towards the Agreement's objectives. By 2025, countries are expected to produce new NDCs covering the post-2030 period, informed during the 2022-23 period by the 6th Assessment Report of the IPCC and the Paris Agreement Global Stocktake.

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

- Provision of information for the preparation of climate policies and national planning for the post-2030 period, in light of the Paris Agreement goals and the need to reduce global net greenhouse emissions to zero by 2050.
- Enhanced international cooperation among the modelling community and other relevant stakeholders to expand the provision of robust in-country advice to decision-makers around the world.
- Enhanced mutual learning among the modelling, social science and policy communities to ensure coherence between different tools used to inform climate action, and consistency with the best available and open science.

Scope:

Proposals should:

- Ensure that Integrated Assessment Models enable the assessment of Paris Agreement-compatible mitigation policies to which policymakers around the world have access.
- Deliver advice and insights that can inform climate action and sustainable development policy design, including biodiversity preservation, at global and national level, based on the best available science.
- Support comparability of model results e.g. between national and global scenarios, and between Integrated Assessment Models and other models used to inform climate action at different geographical scales.
- Identify milestones, drivers and barriers towards achieving climate neutrality in an economically and environmentally responsible and socially inclusive way, including where appropriate by examining implementation of previous or existing climate policies.
- Consider the role of major sectors including energy, water, transport, industry and land use, as well as the sequence of individual, social, economic, structural, and technological changes that could lead to climate neutrality.
- Support the use of model-based and data/driven analysis for climate-policy in the context of sustainable development and recovery from the economic and social impacts of the COVID-19 pandemic.
- Share best practices and build capacities to support the production of national scenarios and to inform domestic stakeholders during and after the lifespan of the action.

Reflecting the nature of climate change as a global challenge, actions should be able to provide insights at global level and of relevance to major emitters and countries from different regions, with different levels of economic development and in-country scientific and institutional capacity.

International cooperation is encouraged, in particular with one or more of the top ten emitters27 and with non-high-income countries28 requiring support for the design and implementation of current and future NDCs.

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

When dealing with models, actions should promote the highest standards of transparency and openness, as much as possible going well beyond model documentation and extending to aspects such as assumptions, code and data that is managed in compliance with the FAIR principles29. In particular, beneficiaries are strongly encouraged to publish results data in open access databases and/or as annexes to publications.

Topic ID and title	HORIZON-CL5-2021-D1-01-05: Better understanding of the interactions between climate change impacts and risks, mitigation and adaptation options				
Budget	EUR 20 million	**Opening date**	24 June 2021	**Deadline 1**	14 September 2021
Budget per project	EUR 6 to 7 million			**Deadline 2**	/
Type of action	Research and Innovation Actions (RIA)				
FTP subsector	Climate change				
Keywords	more effective climate action policies, Intergovernmental Panel on Climate Change (IPCC), synergies, conflicts, trade-offs, mitigation and adaptation strategies, flood protection, co-creation, end-users, social sciences and humanities (SSH)				
FTP comments	Support to WG I, II, III of IPCC				
FTP SIRA 2030 Challenges addressed	1A			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

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

- Enhanced understanding, supported by quantitative and qualitative analysis, of the interaction, complementarity and trade-offs between adaptation and mitigation measures and policies helping to overcome the silo approach within and between them and leading to more effective climate action policies.
- Better knowledge about the risk and impacts of climate change and their interaction with mitigation pathways, including their feasibility across various scenarios of global warming.
- Enhanced legitimacy and robustness of integrated assessment frameworks based on more realistic representation of climate processes and their impacts.
- Contribution to enhanced collaboration among Working Groups I, II, and III of the Intergovernmental Panel on Climate Change.
- Support and interaction with the activities of Horizon Europe Mission “Adaptation to climate change including societal transformation”.

Scope:

Actions should deliver progress in integrating the analysis of the impacts and risks of climate change, mitigation pathways and adaptation strategies into a single framework to help understand and quantify their numerous interactions.

Progress is needed to better reflect the economic damages and reduced well-being due to climate change in mitigation pathway analysis. Actions should integrate state of the art climate science stemming from Earth System Models, Reduced Complexity Models and similar into a common integrated assessment framework. This could include climate change impacts, biodiversity and ecological considerations, Earth system feedbacks and extreme events, and their interaction with mitigation pathways.

Actions should also improve the general understanding of the synergies, conflicts and trade-offs between mitigation and adaptation strategies. For example, many adaptation actions that need to be deployed at a large scale in the short to medium term (in parallel to ambitious mitigation efforts) can have negative impact in terms of emissions. This includes flood and coastal (hard) protection, irrigation and desalination measures as well as increased demand for cooling/air conditioning that are typically highly energy intensive and may put additional stress on energy systems. Another example of an interaction between adaptation and mitigation strategies is the shift towards regenerative and organic agriculture that provides adaptation benefits, but may require expansion of food production areas to compensate for lower productivity with the consequence of more deforestation. Any such potential conflicts and interdependencies should be investigated, taking into account cross-sectorial cascading effects and temporal differences.

Actions should formulate a set of technical and policy recommendations, including sector-specific ones, targeting both public and private stakeholders, to reduce the tensions between mitigation and adaptation strategies. Given that the interactions between mitigation and adaptation often occur at regional and local scale, research should also aim at finding solutions to reconcile the different scales at which mitigation and adaptations strategies are implemented, including improving the territorial resolution of relevant tools. In addition, actions should evaluate the impact on the costs of mitigation and adaptation strategies in Europe when they are treated in an integrated manner. In order to achieve the above-mentioned objectives actions may work on improvements in the modelling of adaptation, particularly in the sectors where adaptation strongly interacts with mitigation (such as energy and agriculture).

Actions should explore effective ways for bridging the gap between modelling theory and practical applications, including through active involvement of and co-creation with

stakeholders and end-users from various relevant fields and social categories, including through case studies in order to test and replicate the results. This should include outreach activities to general public to better explain the trade-offs and interactions between mitigation and adaptation strategies and measures.

Synergies with relevant projects funded under this Work Programme as well those originating from Horizon 2020 should be explored and established during the course of the project. In particular, projects resulting from the topic HORIZON-CL5-2022-D1-01-02-two-stage: Socio-economic risks of climate change in Europe and from Cluster 3 on Disaster Resilient Societies should be foreseen.

When dealing with models, actions should promote highest standards of transparency and openness, as much as possible going well beyond documentation and extending to aspects such as assumptions, code and data that is managed in compliance with the FAIR principles30. In particular, beneficiaries are strongly encouraged to publish results data in open access databases and/or as annexes to publications. In addition, full openness of any new modules, models or tools developed from scratch or substantially improved with the use of EU funding is expected.

Projects funded under this topic should ensure the coordination of their activities.

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.

Call – Climate sciences and responses 2022 two-stage

Topic ID and title	HORIZON-CL5-2022-D1-01-03-two-stage: Social science for land-use strategies in the context of climate change and biodiversity challenges				
Budget	EUR 20 million	**Opening date**	12 October 2021	**Deadline 1**	10 February 2022
Budget per project	EUR 6 to 7 million			**Deadline 2**	27 September 2022
Type of action	Research and Innovation Actions (RIA)				
FTP subsector	Climate change, Biodiversity				
Keywords	future expected land use patterns, key drivers, landowners, public authorities, climate change awareness, biodiversity awareness, managers, land contribution optimisation, Integrated Assessment Models (IAMs), agroforestry, change barriers, land-related GHG flux trajectories, social sciences and humanities (SSH)				
FTP comments					
FTP SIRA 2030 Challenges addressed	1E - 3D,E - 10D			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

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

- A characterisation of future expected land use patterns consistent with long-term objectives (especially on climate, biodiversity and renewable energy) and its comparison with the current situation and trends.
- A comprehensive understanding of the key motivations and drivers (economic, regulatory, legal, cultural, environmental, etc.) behind land-use related decisions in Europe at levels ranging from land owners to public authorities at local, regional and national level, including their relative importance.
- A better understanding of the awareness of key actors (land owners, managers, local authorities, regulatory agencies) about climate change and biodiversity challenges and their willingness to contribute addressing them, including the adoption of new or different practices consistent with long-term expectations.

Support to climate (mitigation, adaptation) and biodiversity policy design and implementation through economic and behavioural insights allowing the efficient targeting of incentives and engagement of stakeholders in a cost-effective manner, taking into account telecoupling (displacement effects through changes in imports and exports).

Scope:

Actions should aim to gain a realistic understanding of the factors behind land-use decisions and how they can be best oriented towards the efficient and socially responsible pursuit of multiple policy objectives on various scales (from the individual field/farm to region to national to continental scale). They should develop a toolbox of instruments and approaches deployable at different levels consistent with long-term goals and strategies considering, inter alia:

- The need for land to provide net sequestration and biomass flows consistent with the demands of various mitigation pathways, on different timescales.
- The continued need for land to provide food, feed and raw materials under increasing climate change and other pressures and needs (e.g., water availability, climate change resilience).
- The potential for demand-side measures that can contribute to long-term objectives (such as sustainable and healthy dietary change) and how they can be deployed.
- The crucial need for halting and, if possible, reversing biodiversity loss in Europe and globally
- The socioeconomic dynamics, behavioural patterns and inertia related to land ownership, management and policies.
- The considerable diversity of land use patterns, approaches and biogeographic conditions in Europe, including land-related resources such as water.
- The need to make the instruments and approaches, including collective learning and negotiation processes at local and landscape scale, widely and practically available to the key actors, to enable sustainable change.
- The need to avoid rebound (detrimental displacement effects).

Actions should focus on one or more of the following issues:

a. Development of realistic scenarios and workable models for optimising the contribution of land to climate change mitigation, adaptation and biodiversity objectives, where possible integrating with Integrated Assessment Models (IAMs), consistent with expectations while reducing conflicts, exploiting synergies and managing risks (agroforestry can be one example

of a system that allows higher productivity, more resilience and more biodiversity at the same time).

b. Economic and behavioural insights into land use related decisions, barriers to change, efficient design of incentives. This should explore the relative merits of instruments (regulatory, market-based, education, soft policy).

c. Explore a range of delivery mechanisms that could best incentivise the upscaling of the required changes under real-life situations in multiple settings (countries, biogeographical regions).

d. Develop workable models for effective and efficient monitoring and incentivising public goods benefits (such as emissions reductions, biodiversity protection and water services).

e. Contribute to the better quantification of land-related greenhouse gas flux trajectories for integrated assessment models on relevant scales (including displacement effects).

Participation of and co-creation with relevant societal stakeholders should be part of the action, including interdisciplinary and transdisciplinary research and the contribution from social sciences and humanities and other relevant disciplines.

Synergies should be ensured with topics related to land-use, biodiversity and ecosystems in Cluster 5 and in other Clusters, with the implementation of the Mission on Adaptation to climate change including societal transformation, as well as with other relevant actions, programmes and initiatives40.

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

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.

Call – Climate sciences and responses 2022

Topic ID and title	HORIZON-CL5-2022-D1-02-03: Improvement of Integrated Assessment Models in support of climate policies				
Budget	EUR 15 million	**Opening date**	12 October 2021	**Deadline 1**	10 February 2022
Budget per project	EUR 5 million			**Deadline 2**	/
Type of action	Research and Innovation Actions (RIA)				
FTP subsector	Assessment of Climate policies				
Keywords	Integrated Assessment Models (IAMs), IPCC, IPBES, IRP, climate action and environmental/sustainability objectives interactions, citizens involvement				
FTP comments					
FTP SIRA 2030 Challenges addressed	1B,E			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

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

- Improved adequacy of Integrated Assessment Models (IAMs) to effectively contribute to international, European, national and regional climate policy processes in support of the implementation of the European Green Deal, the Paris Agreement, COVID-19 recovery and broader sustainability goals
- Contributions to major international scientific assessments such as the reports of the Intergovernmental Panel on Climate Change (IPCC), the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and the International Resource Panel (IRP).
- Increased robustness, legitimacy, relevance, usability and transparency of IAMs leading to increased uptake and better awareness of their results across various end-user groups, developing, where possible, new business models for IAMs transparency (for example, open source and open code options).
- Enhanced coherence between climate action (mitigation, understanding of impacts, climate risks and adaptation) and other environmental/sustainability objectives, notably biodiversity, based on a more realistic representation of their interactions, including co-benefits and trade-offs.
- More active involvement of citizens in climate action based on better understanding and demonstration of how small scale actions contribute to the achievement of large-

scale climate policy objectives including through socially innovative approaches, and better understanding of which actions/policies are more effective.

- Ultimately, accelerated transition towards climate neutrality based on improved knowledge and better designed policies that are more integrated, greener, healthier, more inclusive

Scope:

Actions should improve the state-of-the-art of IAMs by tackling their existing weaknesses and lack of/limited capabilities of the current generation of models in order to provide robust, credible and transparent evidence-base in support of design and evaluation of multiscale (global, European, national, regional) mitigation policies at various time horizons.

An important goal of this call is to address multiple challenges in a coherent and consistent manner using an integrated framework. To achieve this goal, it is not compulsory to incorporate all issues into a single IAM. Combinations of hard linking, soft linking and other ways of insuring a coherent approach between models and experts can be considered.

Actions should address developments and improvements, such as:

- Sectorial detail and (transformative/structural) changes across various sectors of the economy such as those resulting from increased circularity and digitalisation.
- Temporal resolution and technological detail.
- Spatial resolution with outputs suitable for national/regional level analysis.
- Behavioural and lifestyle changes.
- Distributional and equity effects of climate policies.
- Interactions with the relevant sustainable development goals (such as co-benefits due to avoided impacts and trade-offs in areas such as health, biodiversity, food security etc.).
- Climate change impacts, including the extent to which they can be avoided through mitigation action, synergies and trade-offs between climate mitigation and adaptation policies.
- Financial sector and investment needs, including information in support of investment risk-reduction strategies to mobilise capital to finance the transition towards a climate-neutral economy.

- Uncertainties and risk-management strategies for supporting mitigation policies.

The above list is non-exhaustive and actions also may propose new avenues of research, while duly justifying their choice and keeping in mind the impact on IAMs' relevance and adequacy as a decision-support tool. Actions should also explore options for making models more capable of responding to external shocks such as the COVID-19 pandemic or similar. While addressing the improvements, actions should take into account the modelling requirements and learnings resulting from the COVID-19 crisis.

Actions should build on the knowledge base developed by previous initiatives and are encouraged to establish links with other relevant projects financed from this work programme (e.g. circular economy, climate adaptation modelling) and by Horizon 2020. In order to avoid duplication of efforts, proposals should clearly demonstrate how they will go beyond the modelling state of art.

Actions are encouraged to explore alternative approaches to the mainstream economic assumptions typically underlying the models (such as fully functioning markets and perfect information) and aim at striking the right balance between model complexity and usability.

In order to maximise the impact, active involvement of the end-users (policy makers, business, civil society) in the co-design of models and validation of the outputs should be considered. Applicants should investigate and apply communication tools and strategies for improved interaction with stakeholders and dissemination of model results, duly accounting for the needs of non-technical audiences. They should further develop the thinking around the best ways to apply modelling insights to policies, including by building on the learnings from the COVID-19 pandemic. Consortia should also explore ways for better bridging the gap between modelling theory and practical applications, including in support of behavioural change and societal transformation.

It is recommended to include capacity-building efforts to lower the entrance barriers to the established IAM community by involving research teams in EU Member States and Associated Countries that are less advanced in terms of modelling capabilities.

When dealing with models, actions should promote the highest standards of transparency and openness, as much as possible going well beyond documentation and extending to aspects such as assumptions, code and data that is managed in compliance with the FAIR principles46. In particular, beneficiaries are strongly encouraged to publish results data in open access databases and/or as annexes to publications. In addition, full openness of any

new modules, models or tools developed from scratch or substantially improved with the use of EU funding is expected.

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.

Destination 3: Sustainable, secure and competitive energy supply

Call – Sustainable, secure and competitive energy supply 2021

Energy systems, grids and storage

Topic ID and title	HORIZON-CL5-2021-D3-01-04: Clean Energy Transition				
Budget	EUR 70 million	**Opening date**	24 June 2021	**Deadline 1**	19 October 2021
Budget per project	EUR 70 million			**Deadline 2**	/
Type of action	Programme Co-fund Action (COFUND)				
FTP subsector	Funding to co-funded partnership calls on clean energy transition				
Keywords	partnership, clean energy transition research and innovation, Strategic Energy Technology (SET) Plan, evidence-based policy formulation, built environment, transport, industry, low carbon energy, European Partnerships collaboration				
FTP comments					
FTP SIRA 2030 Challenges addressed	10			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

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

a. Increased directionality of clean energy transition research and innovation in Europe in line with the SET Plan by a shared pan-European vision regarding the goal and direction of the required system transformation processes adapted to regional needs and availability of renewable energy resources

b. Evidence based energy and climate policy formulation

c. A wider systemic transition and energy supply required for the climate transition in all sectors of society; enabling the transition of the built environment, transport, industry and other sectors to clean, low carbon energy;

d. An innovation ecosystem for Europe's transition to clean energy and contribute to a resource-efficient energy system, both from an ecological and economic standpoint;

e. A building block to a zero-emission energy system for the decarbonisation of transport, buildings, industry, agriculture in the specific European environment;

f. Increased engagement of consumers and prosumers and in appropriate demand-response mechanisms and its integration in the energy system;

g. And finally, an energy system that meets the needs of different parts of society, in different geographical locations (urban and rural) and different groups.

Scope:

The European Green Deal aims to transform Europe into a fair and prosperous society with a modern, resource-efficient and competitive economy, with no net emissions of greenhouse gases in 2050. To decarbonise Europe, renewables must become the main energy source, while keeping the stability and resilience of the European energy system. Research and Innovation is needed to be able to achieve the Clean Energy Transition, while realizing also the ambitions of other EU policies like the New Circular Economy Strategy and the new Biodiversity Strategy and delivering on the objectives of the European Green Deal. It will also contribute to the Sustainable Development Goals of the United Nations (in particular SDG 7 Affordable and Clean Energy and SDG 9 Industry, Innovation and Infrastructure). At national level, policies and measures in clean energy research and innovation will support the achievement of the energy and climate targets, as outlined in the National Energy and Climate Plans.

The Clean Energy Transition Partnership (CETP) aims to empower the energy transition and contribute from a R&I perspective to the EU's goal of becoming the first climate-neutral continent by 2050. To achieve this ambitious goal, Europe needs to embark into a transformative process of both the energy system and its supporting technologies, as well as of the society. Key enabling and disruptive technologies, as well system innovation are essential for this transition. With robust investment in innovation and technology development, the energy transition turns into an opportunity for sustainable growth and competitiveness, creating high-quality jobs and leaving nobody behind.

The Clean Energy Transition partnership is expected to contribute to the overarching goal of transitioning to a clean energy system by pooling national and regional resources/funding programmes thus overcoming a fragmented approach. In its Strategic Research and Innovation Agenda, the Clean Energy Transition Partnership will address the following areas: Development of clean and affordable energy production and conversion technologies; development of a climate neutral, flexible and robust energy system; storage and its integration in the energy system; resource and energy efficiency and circular flows in the

energy sector for an ecologically sustainable energy system; a just and inclusive energy transition; sector integration and coupling; and digital transformation.

The partnerships actions are expected to contribute to:

- a better cost performance by improving efficiency, sustainability, reliability and circularity of a broad portfolio of clean energy technologies and solutions;
- the integration of a wide range of new energy solutions and 'first of a kind' technologies on all levels of the energy system to give flexibility, promote and efficiently manage self-generation and consumption profiles and new holistic solutions for energy storage (surplus energy, peak load supply, inter-seasonal storage);
- the acceleration of the sustainable energy transition and societal development by the use of opportunities arising from the digital transformation and from data and information from the Copernicus programme, as well as the European Union's Earth Observation programme.

The partner composition is expected to at least include a geographically representative distribution of national and regional research and innovation authorities and funding agencies from EU Member States, associated countries and their regions. The number of partners and their contribution should be enough to attain a critical mass in the field. The partnership should be open to the addition of new partners during the lifetime of the partnership. The partnership should pool the necessary financial resources from the participating national (or regional) research programmes with a view to implementing joint calls for transnational proposals resulting in grants to third parties and in accordance to the ambition of activities proposed.

The CETP will have to overcome the transnational challenges in the clean energy transition following the ambition of the European Green Deal via a joint, shared, transnational approach, engaging a wide variety of stakeholders including industry and research institutes.

The partnership has to provide a platform that makes research results available for the best use and implementation for all stakeholders and to support capacity building in areas requiring specific resources and expertise. By doing this, public and private investments in clean energy technologies development and deployment can be leveraged and capitalised to ensure adequate exploitation of results across Europe as needed.

Based on priorities identified in the Clean Energy Transition Strategic Research and Innovation Agenda, proposals should pool together the necessary financial resources from the participating national (or regional) research programmes with a view to implementing annual joint calls for proposals resulting in grants to third parties with EU co-funding. National efforts should reflect the ambitions outlined in the National Energy and Climate Plans, including on Member States/Associated Countries participation in the SET Plan work streams. Participation of legal entities from international partner countries and/or regions including those not automatically eligible for funding in accordance with General Annex A is encouraged in the joint calls.

The partnership should envisage clustering activities with other relevant selected projects for cross-projects co-operation, consultations and joint activities on cross-cutting issues. To this end, proposals should provide for a dedicated work package and/or task, and earmark the appropriate resources accordingly. The partnership should also present and implement a joint programme of activities focussed on communication (participation in joint meetings and communication events), dissemination and exploitation.

The partnership is expected to collaborate closely with the following European Partnerships:

- Clean Hydrogen, Built Environment and construction, European industrial battery value Chain and Driving Urban Transition within the Cluster Climate, Energy and mobility;
- Smart Networks and services, Clean Steel –Low carbon steelmaking, Carbon Neutral and Circular Industry and Geological Services for Europe within the Cluster Digital, Industry and Space;
- Circular Bio-based Europe within the cluster Food, Bioeconomy, Natural Resources, Agriculture and Environment;
- And the Climate-KIC and InnoEnergy EITs;

in order to ensure coherence and complementarity of activities. Applicants are expected to describe in their proposal the methodology for their collaboration and the aims they want to achieve with this kind of collaboration.

It is expected that the partnership will organise joint calls on an annual base from 2022 to 2027 and will consider ample time for the implementation of the co-funded projects.

The Commission envisages to include a new action in future work programme(s) to award a grant to identified beneficiaries with the aim of continuing to provide support to the partnership for the duration of Horizon Europe.

Call – Sustainable, secure and competitive energy supply 2021

Global leadership in renewable energy

Topic ID and title	HORIZON-CL5-2021-D3-02-02: Sustainability and educational aspects for renewable energy and renewable fuel technologies				
Budget	EUR 10 million	**Opening date**	24 June 2021	**Deadline 1**	05 January 2022
Budget per project	EUR 2,5 million			**Deadline 2**	/
Type of action	Coordination and Support Actions (CSA)				
FTP subsector	Bioenergy/Biofuels				
Keywords	Social and environmental aspects, circularity, recycling, training, reskilling, universities, industry-academia programme, social sciences and humanities (SSH)				
FTP comments	Enhance and promote sustainability by addressing social and environmental aspects, Support the development of training and reskilling efforts in the renewable energy and renewable fuel technology sectors, Support and promote circularity concepts and approaches				
FTP SIRA 2030 Challenges addressed	10D			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

The EU has ambitious goals to tackle the ongoing climate crisis, noteworthy being the aim to be a fully climate-neutral continent by 2050. Thus a framework needs to be established where sustainability and educational aspects for renewable energy and fuel technologies is addressed. Further, these actions need to engage with stakeholders at different levels (policymakers, regulators, innovators, industry, trade associations, universities and local communities) in order to align priorities and needs, while also identifying possibly overlooked challenges.

In this context, and taking into consideration circularity and sustainability, project results are expected to contribute to all of the following expected outcomes:

- Enhance and promote sustainability by addressing social and environmental aspects (air pollution, waste management, job opportunities, wildlife concerns, etc.) of renewable energy and renewable fuel technologies at a global level, thus ensuring the European Green Deal priorities are met.
- Support the development of training and reskilling efforts in the renewable energy and renewable fuel technology sectors, while also identifying (global and local)

challenges, to realise the large deployment ambitions of the European Green Deal, and the various sectorial strategies under it (such as the recent Offshore Renewable Energy Strategy) and its external dimension.

- Support and promote circularity concepts and approaches (such as circular- and/or recyclable-by-design) in line with the Circular Economy Action Plan and the Action Plan on Critical Raw Materials.

Scope:

In this topic, sustainability is meant in environmental, social and economic terms. The proposal is expected to address all the following aspects:

- Coordinate the stakeholder community and propose concrete actions to promote and accelerate the development of sustainable solutions for renewable energy and renewable fuel technologies, encompassing 'circularity-by-design' (with special attention to life cycle assessment of the entire value chain, including critical raw materials and gradual substitution of fossil fuels), and identifying and assessing relevant externalities.

- Set up and initiate a structured programme to promote an innovative multi-disciplinary approach on teaching and engaging with the sustainability of all forms of renewable energy. The proposal should also actively engage with European universities in this matter. Special consideration to gender balance issues should also be given. A clear post-project life for such programme should also be addressed.

- Develop and run an industry-academia programme focused on hands-on training. This programme should identify the required skills needed for the sustainability of renewable technologies, identify and act on knowledge gaps, and identify retraining opportunities based on revamped training curricula and course content. These concerted actions are expected to develop human capital in innovative new technologies through education and training.

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.

Cross-cutting issues

Topic ID and title	HORIZON-CL5-2021-D3-02-15: Support to the activities of the ETIPs and technology areas of the SET Plan				
Budget	EUR 9,8 million	**Opening date**	24 June 2021	**Deadline 1**	05 January 2022
Budget per project	EUR 1 million			**Deadline 2**	/
Type of action	Coordination and Support Actions (CSA)				
FTP subsector	European Technology Platforms				
Keywords	renewable fuels & bioenergy, Strategic Energy Technology (SET) Plan, European Technology and Innovation Platforms (ETIPs)				
FTP comments	European Technology (and Innovation) Platforms, SET-Plan				
FTP SIRA 2030 Challenges addressed				**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

Engagement of stakeholders is pivotal in the transition to a clean energy system and the achievement of the zero-emissions target.

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

- Consolidation of strong and sustainable networks in the different technology areas covered through the Strategic Energy Technology (SET) Plan and its integrated roadmap.
- Cooperation among ETIPs and similar stakeholders fora, support to existing SET Plan Implementation Plans and advancement towards more interconnected activities, both in terms of contents and implementation mechanisms.

Scope:

In 2015, the launch of the Energy Union saw the SET Plan incorporated as the Energy Union's fifth pillar on 'Research, Innovation and Competitiveness'. Through the Communication "Towards an Integrated Strategic Energy Technology (SET) Plan", the Integrated SET Plan set ambitious R&I targets which remain relevant and essential in the new context of the European Green Deal and the Recovery Plan for Europe.

Depending on the sector, European Technology and Innovation Platforms (ETIPs), and/or SET Plan Implementation Working Groups (IWG) and/or similar stakeholders fora support the

development and implementation of the SET Plan R&I priorities by bringing together relevant stakeholders in key areas from industry, research organisations and, where applicable, SET Plan Countries' government representatives. They develop research and innovation agendas and roadmaps, industrial strategies, analysis of market opportunities and funding needs, understanding of innovation barriers and exploitation of research results, which are in line with the Recovery Plan for Europe and latest EU climate and energy related policies. They also provide consensus-based strategic advice to the SET Plan initiative covering technical and non-technological aspects.

Considering the overarching aim of the clean energy transition, ETIPs, IWGs and/or similar fora are encouraged to align and coordinate their activities, defining cross-cutting aspects for accelerating the clean energy transition and contribute to the development of a European Research Area in the field of Energy. Proposals should support ETIPs and/or IWGs and/or stakeholders fora of one of the above-listed sectors, taking into consideration the specific needs of the sector they address and the emerging policy priorities for their implementation as well as the coordination with other initiatives/projects, in order to avoid overlaps.

ETIPs, IWGs and stakeholders fora should ensure the participation of companies (industry and SMEs), research and civil society organisations, universities and European associations representing relevant sectors (as applicable) from a representative number of SET Plan countries establishing links with national authorities. To maximise their impact and widen participation, they are encouraged to develop and implement robust outreach approaches and societal engagement actions to span across the EU and associated countries.

Special attention should be given to the key challenges of the European Green Deal, including, but not limited to, technological pushback, industrial production, societal transformation, and just transition. Likewise, contributions to the goals of the European Research ERA in the field of energy, in particular regarding how to incentivise investing in research and innovation should be addressed.

Furthermore, proposals should develop a dissemination and exploitation strategy and implement dissemination and networking activities with other existing ETIPs and IWGs (e.g. joint workshops, thematic conferences, webinar series, regular exchanges, etc.). Relevant outputs of these CSAs will feed into the SET Plan information system (SETIS).

This topic requires the effective contribution of SSH disciplines and the involvement of SSH experts, institutions as well as the inclusion of relevant SSH expertise, in order to produce

meaningful and significant effects enhancing the societal impact of the related research activities.

Proposals should address one of the following sectors: carbon capture storage and use, geothermal systems, hydropower, ocean energy, photovoltaics, renewable fuels & bioenergy, concentrated solar thermal energy (CSP & STE), renewable heating and cooling, wind energy, energy efficiency in industry, energy efficiency in buildings.

Proposals submitted under this topic are encouraged to include actions designed to facilitate cooperation, across Europe, with other projects and to ensure the accessibility and reusability of data produced in the course of the project. Proposals should include a finance and sustainability plan for future continuation beyond the lifetime of the proposal.

The indicative project duration is 3 years.

The requested budget for actions in the areas of concentrated solar thermal energy, energy efficiency in industry and energy efficiency in buildings should be around EUR 0.6 million because in these sectors there is no ETIP, only a SET Plan IWG with lighter structure and activities. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

Call – Sustainable, secure and competitive energy supply 2021

Global leadership in renewable energy

Topic ID and title	HORIZON-CL5-2021-D3-03-14: Demonstration of large-scale CHP technologies for a shift to the use of biogenic residues and wastes				
Budget	EUR 10 million	**Opening date**	2 September 2021	**Deadline 1**	23 February 2022
Budget per project	EUR 10 million			**Deadline 2**	/
Type of action	Innovations Actions (IA)				
FTP subsector	P&P + Bioenergy				
Keywords	bioenergy, retrofitting of fossil CHP systems, sustainable biogenic residues				
FTP comments	Retrofitting of Combined Heat Power (CHP) from fossil to bioenergy sources. Might be interesting for some pulp&paper mills				
FTP SIRA 2030 Challenges addressed	10B			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	7

Expected Outcome:

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

- Advance the European scientific basis and increase technology competitiveness in the area of bioenergy, in particular increase penetration of renewables, regional development, cost reduction and feedstock enlargement thus supporting the EU goals for climate protection, energy independence and economic growth;
- Technology de-risk retrofitting of large-scale fossil CHP to bioenergy as a necessary step before scaling up at commercial level;
- Allow high penetration in the energy system, ensure stability and security of energy supply and gain efficiency and costs in transforming the energy system on a decarbonised basis, in particular by reducing CAPEX for bioenergy capacity and base-load capability;
- Enhance sustainability of renewable energy and fuel value chains by addressing social, economic and environmental aspects.

Scope:

Demonstration of cost-effective and efficient technologies for retrofitting of fossil CHP systems to the complete use of regionally sourced sustainable biogenic residues and wastes or derived intermediate bioenergy carriers for continuous, cost-effective and low- emission operation. Proposals are expected to address long-term scenarios for flexible and modular operation within the energy system network and document all demonstrators fully and transparently, to ensure replicability, up-scaling and to assist future planning decisions.

Call – Sustainable, secure and competitive energy supply 2022

Global leadership in renewable energy

Topic ID and title	HORIZON-CL5-2022-D3-02-04: Technological interfaces between solar fuel technologies and other renewables				
Budget	EUR 10 million	**Opening date**	26 May 2022	**Deadline 1**	27 October 2022
Budget per project	EUR 3 to 5 million			**Deadline 2**	/
Type of action	Research and Innovation Actions (RIA)				
FTP subsector	Renewable energy				
Keywords	policy making evidence, technological leadership, fossil-free economy, renewable fuel production, renewable fuel storage, capital expenses (CAPEX) reduction, operational expenses (OPEX) reduction,				
FTP comments	bridging solar energy and other renewables in boosting renewable fuel production and storage				
FTP SIRA 2030 Challenges addressed	10D			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	4

Expected Outcome:

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

- Advance the European scientific basis, technological leadership and global role in the area of renewable and solar fuels, while creating evidence for policy making;
- Provide breakthrough solutions towards a fossil-free economy and ecosystem by bridging solar energy and other renewables in boosting renewable fuel production and storage with the potential of strongly reducing CAPEX and OPEX/toe, high penetration in the energy system, ensuring stability and security of energy supply;
- Increase European technology competitiveness in solar and renewable fuel technologies, thus supporting the EU goals for climate protection, energy independence and economic growth.

Scope:

Development of energy transmitting technological interfaces to couple solar fuel technologies to other renewables such as from e.g. biosources or directly connected renewable power generation, which allow for efficient feed in of other forms of renewable

energy into solar fuel conversion technologies and allow for efficient and continuous renewable fuel production.

Cluster 6 : Food, Bioeconomy, Natural Resources, Agriculture and Environment[3]

Destination 1: Biodiversity and ecosystem services

Call – Biodiversity and Ecosystem Services 2021

Understanding biodiversity decline

Topic ID and title	HORIZON-CL6-2021-BIODIV-01-01: European participation in global biodiversity genomics endeavours aimed at identifying all biodiversity on Earth				
Budget	EUR 20 million	**Opening date**	22 June 2021	**Deadline 1**	06 October 2021
Budget per project	EUR 10 to 20 million			**Deadline 2**	/
Type of action	Research and Innovation Actions (RIA)				
FTP subsector	F&F				
Keywords	ecosystem diversity, genomics techniques, genome sequencing, DNA barcoding, citizen scientists, non-professional taxonomists				
FTP comments					
FTP SIRA 2030 Challenges addressed	1A,E			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

In support of the implementation of the Green Deal and the EU biodiversity strategy for 2030, successful proposals will help to create and maintain European nodes and networks integrated into global biodiversity genomics initiatives and help to better understand biodiversity decline, its main direct drivers and their interrelations.

Projects results are expected to contribute to at least four of the six following expected outcomes:

- Creation and management of the European node of the International Barcode of Life.
- Creation of a European hub affiliated to the Earth Biogenome Project, with a common goal and clear targets.
- Development of the necessary networks, technologies, quality standards, reference atlas and taxonomic expertise through Europe to systematically, and

[3] Work Programme published by the European Commission on 15 June 2021

comprehensively identify specific, intra-specific and ecosystem diversity through genomics techniques, such as full-genome sequencing, barcoding and metabarcoding.

- Advances in the assessment of pan-European biodiversity via genome sequencing and/or DNA barcoding of threatened/endangered species, ecologically through barcoding and/or genome sequencing (animals, plants, fungi and microorganisms), ecological keystone species and economically important species, (e.g. pollinators and their biome, soil, forest, and marine and/or freshwater communities as well as invasive species and/or disease vectors).
- Pan-European barcoding of pollinators by completing the Barcode of Life for European bees, butterflies, moths and hoverflies.
- The active support and cooperation of citizen scientists and other non-professional taxonomists.

Scope:

DNA-based identification systems can track biodiversity change on large geographic scales and reveal the interactions among the species in a biome. On the other hand, fully sequencing life, including, when relevant, information on symbiotic organisms, microbiomes and parasites, is expected to provide new tools for the conservation, preservation and regeneration of biodiversity, drug discovery and advanced biotechnology.

The International Barcode of Life (iBOL) consortium has set up high-throughput barcoding infrastructure to barcode all biodiversity on Earth by 2045 with the help of the international community and several new infrastructures across the world. Several EU and associated countries currently participate in the barcoding endeavour, but there is no pan-European node of iBOL as such.

Similarly, the Earth BioGenome Project (EBP), initiated in 2018, aims to sequence and catalogue the genomes of all of Earth's currently described eukaryotic species over a period of 10 years. Several European groups have joined the endeavour but no European target or project has been proposed yet.

Proposals should set up one or both European hubs for iBoL and/or EBP, and leverage resources and expertise to advance in completing the barcoding and/or sequencing of European biodiversity in a smart and efficient way, taking advantage of existing networks, infrastructures and expertise. Specific groups of ecological or economic importance, or

species under threat, such as pollinators, mycorrhizal fungi, invasive species or disease vectors, should be sufficiently prioritised.

Projects should sufficiently plan their barcoding effort to maximise possible applications, such as, for example: registering patterns of biodiversity across ecoregions to forecast changes in response to anthropogenic drivers of biodiversity loss; discovering new species; tracking invasive alien species by metabarcoding forest soil samples, freshwaters or coastal waters; revealing symbiomes and trophic chains, etc. Proposals should contribute to the EU biodiversity strategy for 2030 by generating the reference genomes of the representative species across the tree of life, leveraging the existing genome sequencing facilities. Sample collection standards and protocols should be developed, validated and adopted, as should engagement actions and tools to allow citizens and other non-professional-taxonomist stakeholders to participate at different stages of the activities.

Data, results and methodologies from projects funded under this topic should contribute to the EC Knowledge Centre for Biodiversity21, and be permanently and openly accessible in any relevant repositories. International cooperation with strategic third country partners is strongly encouraged, for example with Canada.

Topic ID and title	HORIZON-CL6-2021-BIODIV-01-02: Data and technologies for the inventory, fast identification and monitoring of endangered wildlife and other species groups				
Budget	EUR 10 million	**Opening date**	22 June 2021	**Deadline 1**	06 October 2021
Budget per project	EUR 3 to 5 million			**Deadline 2**	/
Type of action	Research and Innovation Actions (RIA)				
FTP subsector	F&F				
Keywords	Biodiversity, Birds and Habitat Directive, Copernicus, Galileo, remote sensing, Artificial Intelligence (AI), IUCN Red List				
FTP comments					
FTP SIRA 2030 Challenges addressed	1B			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome

In support of the implementation of the Green Deal, the EU biodiversity strategy 2030 and the Birds and Habitats Directives, successful proposals will help to bridge taxonomic and monitoring gaps, by providing methods, data, knowledge and models on the conservation status and ecological requirements of species and habitats and help to better understand and address biodiversity decline, its main direct drivers and their interrelations.

Projects results should contribute to some of the following expected outcomes:

- Systemic, integrated and (open-)standardised data, knowledge and models on the conservation status and ecological requirements of species and habitats, with a focus on those covered by the Birds and Habitats Directives and IUCN Red List. This will lead to better management of protected sites and species, in particular with a view to setting conservation objectives and developing appropriately designed and effective management plans
- The bridging of taxonomic and monitoring gaps thanks to new enabling tools, technologies, fast identification methodologies and integrated monitoring systems across Europe on wildlife species. These will help to identify biodiversity threats, such as invasive species, emergence of disease threats, conflict situations with production animals and/or human communities, etc.
- Models upscaling the results of biodiversity assessments to wider areas, based on existing datasets of environmental descriptors.

- Integrative taxonomy of inventory pollinator species (bees, butterflies, moths and hoverflies), soil fauna (mites, springtails, woodlices, millipedes and earthworms) and/or other threatened species groups

Scope

The EU biodiversity strategy contains concrete objectives to protect and restore biodiversity and to address the main pressures and threats to biodiversity. In order to achieve these objectives, basic research is needed to better understand, monitor, observe and manage biodiversity, including in protected areas. Such knowledge is also indispensable to support the protection and restoration of natural capital and ecosystems.

Better, accessible and FAIR22 data on species, biodiversity and ecosystems will also help to ensure that biodiversity preservation is a mainstream feature of other sectors, such as agriculture, transport, energy or the bioeconomy. There is a need for systemic and standardised biodiversity data on the ground in order to build up our knowledge on the status and trends of habitats and species and ecosystems, and on the drivers of decline.

Monitoring needs to be of better quality, greater relevance and more cost-effective. This is to be achieved by, among other things, developing, testing and implementing new (long-term) approaches that make use of recent technological advances and existing data from multiple origins (e.g. observation data, remote sensing, DNA technologies, big data analysis, AI, deep learning, historical records, use of citizen science and volunteer expert data).

Projects should develop, test and implement enabling tools, technologies and fast identification methodologies to produce and integrate data, knowledge and models on the conservation status of species and habitats, with a focus on those covered by the Birds and Habitats Directives. Projects should also help to develop an integrated European biodiversity monitoring system, in collaboration with the initiatives and projects mentioned below. There needs to be a particular focus on to those species and habitats, for which knowledge gaps still exist, and on those prioritised for conservation action in line with the EU biodiversity strategy 2030, such as pollinators, sea birds, marine mammals, invertebrates, amphibians, reptiles, bats, mosses, lichens, wetlands, coastal and marine areas, grasslands, mires, bogs and fens, heathland and shrubs.

The biogeographical approach of the Natura 2000 network needs to be taken into account. If the proposal addresses the pollinator-related outcomes, projects should produce an inventory of pollinator species through integrative taxonomy, and bridge taxonomic gaps by developing tools (field guides, identification keys, national reference collections and

checklists, European online ID platform, image recognition/apps, digitalised collections, etc.) for bees, butterflies, moths and hoverflies.

Projects should contribute their data to the Knowledge Centre for Biodiversity23 and earmark the necessary resources for cooperation with the Centre; projects should also promote synergies with the European co-funded partnership on biodiversity24 (HORIZON-CL6-2021-BIODIV-02-01) and its activities. Cooperation is also expected with other relevant projects and initiatives, such as EUROPABON25 which was awarded funding under the call 'SC5-33-2020: Monitoring ecosystems through research, innovation and technology', or with projects resulting from this specific call as well as other EU-funded calls. Strong collaboration and networking is expected with the future taxonomy CSA resulting from topic HORIZON-CL6-2022-BIODIV-01-02: 'Building taxonomic research capacity near biodiversity hotspots and for protected areas by networking natural history museums and other taxonomic facilities'.

Valuing and restoring biodiversity and ecosystem services

Topic ID and title	HORIZON-CL6-2021-BIODIV-01-05: The economics of nature-based solutions: cost-benefit analysis, market development and funding				
Budget	EUR 5 million	**Opening date**	22 June 2021	**Deadline 1**	06 October 2021
Budget per project	EUR 5 million			**Deadline 2**	/
Type of action	Research and Innovation Actions (RIA)				
FTP subsector	F&F				
Keywords	Nature-based solutions (NBS), cost-benefit analysis, Sustainable Finance				
FTP comments					
FTP SIRA 2030 Challenges addressed	2E - 7C			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome

A successful proposal will support the development of policies, business models and market conditions to scale up and speed up the implementation of nature-based solutions (NBS)38. It will contribute to the wider deployment of NBS and to fully reaping their economic, employment, social and environmental benefits in order to build a competitive sustainability in Europe and to tackle climate change. NBS contribute to the EU biodiversity strategy for 2030 and other Green Deal priorities, by supporting biodiversity and vital ecosystem services: climate change mitigation and enhancement of carbon sinks, biomass provision, access to fresh water, clean soil, healthy diets and lifestyles and sustainable food systems. NBS deployment will also create green jobs and build resilience to climate change and natural disasters.

Successful proposals will contribute to all following expected outcomes:

- Better understanding of the economic and financial performance of NBS, contributing to a greater promotion of investments in NBS and to an acceleration of market uptake.
- NBS markets are further developed and better structured.
- Actors involved in NBS markets are better equipped to conduct cost-benefit analysis and monetisation of NBS, and to address their funding needs, for greater implementation of NBS, including ecosystem-based disaster risk reduction approaches.

- NBS business cases are strengthened, contributing to greater adoption of NBS and awareness of their benefits.
- Regional and Europe-wide advisory services are equipped with better tools and create multi-stakeholder networks to more effectively support NBS project development and investment vehicles.
- Informing Mission Adaptation to Climate Change, the EU Adaptation Strategy and the EU Taxonomy on Sustainable Finance.
- Assess potential skill gaps and devise trainings to tackle this skill shortage

Scope

Developing markets for NBS has proved a continuing challenge. NBS investments are many and varied, with their benefits and costs differing by project type and context. They produce a range of benefits, many of which are public goods with limited revenue streams that may accrue to different stakeholder groups. Detailed understanding of these benefits is lacking. The same is true for potential economic benefits resulting from avoidance or reduction of costs due to NBS intervention (such as those related to insurance, penalty or capital costs). In addition, the variety of NBS and their context-specific nature across urban, periurban and rural realms, makes it difficult to predict reliably their commercial prospects. These features make financing of NBS projects challenging and investment from the private sector particularly so. As a result, funding of NBS has typically focused on a narrow range of public sources. Addressing knowledge gaps about the economic and financial performance of NBS investments, in combination with trialling the development of business cases and models for NBS implementation39 is particularly urgent in the current context where NBS need to be exponentially scaled up to meet the policy priorities of the European Green Deal. Despite growing interest in NBS, upscaling NBS investment would require better understanding of different return on investment (ROI) models while accounting for indirect revenue streams associated with NBS (e.g. lower insurance costs for local government from investment in flood defences). The successful proposal should:

- Provide guidance for project developers and decision makers to take informed decisions about NBS: e.g. comparison of strengths and weaknesses of green and grey solutions in climate change adaptation; cost-benefit assessments for NBS (including both the initial capital investment and maintenance stage); resilience and insurance values of NBS; assessment of other co-benefits of NBS, including non-monetary ones. Synergies should be considered with the dedicated topic HORIZON-CL6-2021-BIODIV-

01-06: Nature-based solutions, prevention and reduction of risks and the insurance sector;

- Analyse the potential for development of specific demand and supply chains in NBS;
- Provide methodological guidance on assembling NBS business cases, applying a Total Economic Value framework, of practical use to practitioners in making the case for NBS investments;
- Develop a coaching programme on NBS readiness assistance where businesses and projects selected for Investment Readiness Assistance receive coaching packages tailored specifically to their readiness levels and business objectives to advance the maturity of projects, taking also into account skill gaps;
- Create new or assess, streamline and provide access to existing toolboxes to support regional needs related to NBS financing and implementation; Consider the diversification of financing arrangements and mixes: co-financing and benefit sharing options with the private sector; PPPs; innovative financing mechanisms; and innovative arrangements, e.g. to involve and compensate the land owners who provide the space for NBS implementation;
- Assess the impacts and opportunities for NBS associated with the EU Taxonomy on Sustainable Finance and support the practical implementation of the Taxonomy by stakeholders;
- Analyse innovative financing approaches, including NBS 'green bonds' and blended finance at appropriate levels (e.g. European cities), while considering synergies with the European Investment Bank and any other relevant actors;
- Identify the potential for private investment in different NBS typologies and identify the critical conditions/actions necessary for upscaling, including research related needs. Provide a strategy for greater finance mobilisation through, for example, a NBS investment community or marketplace where potential project partners, entrepreneurs, investors, and innovation stakeholders can meet to discuss and advance investment in NBS;
- Identify and analyse case studies of multiple-benefit, co-governance/co-ownership projects with participation of the private sector, exploring their costs and benefits, analysing their financing strategies and identifying critical success factors;

- Explore synergies and interconnection of different EU initiatives (such as INTERREG, LEADER, URBACT, Covenant of Mayors, etc.) in terms of financing and potential for more coordinated actions and aggregated impact on NBS;
- Develop additional training and tailored courses, networking and B2B matchmaking sessions and other relevant events.

Proposals should address all of the above points.

This topic should involve the effective contribution of SSH disciplines.

Collaboration with the Biodiversity Partnership 40 (HORIZON-CL6-2021-BIODIV-02-01) is expected in the context of reinforcing the knowledge base for assessing, developing and deploying nature-based solutions.

Applicants should create synergies with projects under the same topic and other relevant ongoing or up-coming projects, notably the Horizon 2020 NBS project portfolio and its task forces; HORIZON-CL6-2021-BIODIV-01-06: Nature-based solutions, prevention and reduction of risks and the insurance sector; HORIZON-CL6-2022-BIODIV-01-03: Network for nature: multi-stakeholder dialogue platform to promote nature-based solutions; HORIZON-CL6-2022-COMMUNITIES-01-05: Assessing the socio-politics of nature-based solutions for more inclusive and resilient communities; HORIZON-CL6-2022-COMMUNITIES-02-02-two-stage: Developing nature-based therapy for health and well-being; HORIZON-CL6-2021-COMMUNITIES-01-06: Inside and outside: educational innovation with nature-based solutions.

To this end, proposals should include dedicated tasks and appropriate resources for coordination measures, foresee joint activities and joint deliverables.

Proposals should ensure that all evidence, information and project outputs are accessible through the Oppla portal (the EU repository for NBS)41.

Topic ID and title	HORIZON-CL6-2021-BIODIV-01-06: Nature-based solutions, prevention and reduction of risks and the insurance sector				
Budget	EUR 4 million	**Opening date**	22 June 2021	**Deadline 1**	06 October 2021
Budget per project	EUR 4 million			**Deadline 2**	/
Type of action	Coordination and Support Action (CSA)				
FTP subsector	F&F				
Keywords	Nature-based solutions (NBS), competitive sustainability, climate change adaption, disaster risk reduction, insurers				
FTP comments					
FTP SIRA 2030 Challenges addressed				**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

This topic aims to support the development of policies, business models and market conditions to scale up and speed up the implementation of nature-based solutions (NBS)42. It will contribute to the wider deployment of NBS and to fully reaping their economic, social and environmental benefits in order to build a competitive sustainability in Europe and to tackle climate change. NBS contribute to the EU biodiversity strategy for 2030 and other Green Deal priorities, by supporting biodiversity and vital ecosystem services, notably building resilience to climate change and natural disasters.

Successful proposals will contribute to all following expected outcomes:

- More robust and integrated NBS for climate change adaptation and disaster risk reduction at local, regional, national and European level, notably contributing to the EU's Action Plan on the Sendai Framework for Disaster Risk Reduction, the EU Adaptation Strategy and Mission Adaptation to Climate Change.
- Wider recognition and implementation of NBS as their benefits (avoided damages) are fully recognised when compared to the costs of inaction, thus contributing to greater resilience and competitiveness of the European economy and society.

Greater engagement of the insurance sector in NBS markets and NBS funding and collaboration with other actors across different countries, regions, and cities.

Scope:

Topic ID and title	HORIZON-CL6-2021-BIODIV-01-09: Assessing and consolidating recent scientific advances on freshwater ecosystem restoration.				
Budget	EUR 0,5 million	**Opening date**	22 June 2021	**Deadline 1**	06 October 2021
Budget per project	EUR 0,5 million			**Deadline 2**	/
Type of action	Coordination and Support Action (CSA)				
FTP subsector	F&F				
Keywords	Biodiversity, restoration, carbon storage, freshwater ecosystems				
FTP comments					
FTP SIRA 2030 Challenges addressed	1C			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

In support of the implementation of the Green Deal and the Biodiversity Strategy, a successful proposal will improve the knowledge to restore ecosystems and halt biodiversity loss, in particular Destination 1 impact "Biodiversity in Europe is back on a path of recovery by 2030; ecosystems and their services are preserved and sustainably restored on land, in inland water and at sea through improved knowledge and innovation.

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

- Support public authorities and other organisations engaged in ecosystem restoration to implement and prioritise innovative restoration approaches.
- Increase evidence of the potential of innovative restoration approaches to halt biodiversity loss and contribute to carbon storage in sediments and soils.
- Build the foundations for large scale restoration projects and related investments.

Scope:

The costs from climate-related hazards in Europe are increasing and are likely to rise even further and faster over the coming century due to a projected increase in the severity and frequency of events brought by climate change. This will exacerbate other changes related to land use and urbanisation. While encompassing the whole cycle of disaster risk management, in line with the implementation of the EU Sendai Framework over the next ten years (2015-2030) and the new EU Adaptation Strategy, special attention on the role of prevention and risk reduction in Europe is needed, notably through nature-based solutions

(NBS). The role that the insurance and reinsurance industry can play in resilience and risk reduction is not sufficiently explored. Previous research highlights that the insurance sector can support action as institutional investors, insurance providers, innovators of new insurance products or as partners bringing their risk management expertise43. Data collected by insurance companies can help municipalities in their understanding of risk and to better prioritize climate adaptation measures44. However, several barriers remain insufficiently addressed to further engage the insurance sector in the particular case of NBS – from data management issues to overcoming the uncertainty of investments, or finding adequate regulatory incentives45.

The successful proposal should:

- Establish a network and the needed collaborative and participatory arrangements and spaces between all relevant stakeholders in risk reduction across scales: insurers and re-insurers (including insurance associations), public authorities (local, regional and/or national), financing bodies (e.g. the EIB and other investors), farmers associations, relevant actors from the scientific community and potential links to other relevant initiatives (such as the Covenant of Mayors);
- Facilitate a dialogue at different levels of such a network of stakeholders on potential opportunities, strategies or mechanisms to foster collaborative action for a more robust decision-making and for increased risk prevention through NBS;
- Identify risk-related data requirements, mechanisms, existing tools, and opportunities for better data sharing (and data crowdsourcing) to identify areas at risk and potential areas of intervention through NBS or hybrid approaches;
- Support the establishment of secure and efficient data sharing mechanisms between local authorities, insurers and the private sector, taking into appropriate consideration data privacy issues;
- Develop agreed and robust metrics for the quantification of risk reduction performance, and/or ways to assess risk mitigation potential from NBS, including better integration of NBS models and catastrophe models, damage estimates under climate change scenarios and avoided damages;
- Identify financing options and existing success stories for NBS investments from insurance companies, including through blending mechanisms;
- Identify new insurance products that are transparent and affordable in terms of risk premiums and/or pooling of risks;
- Highlight best practices, and remaining gaps, related to the use of NBS to reduce and control risks, considering the type of hazard, location, and scale of intervention;

- Identify specific case studies related to NBS and reduction of risk in EU policies and strategies (e.g. the EU adaptation strategy, the action plan on the Sendai framework for disaster risk reduction, the common agricultural policy (CAP), the EU forest strategy, the Water Framework Directive, the Floods Directive, restoration objectives in the EU biodiversity strategy, etc.).

Proposals should address all of the above points.

Complementary activities such as interviews, research reviews and small research/experimentation-oriented actions may be envisaged. The stocktaking of previous Horizon 2020 projects on NBS, and how these results can be integrated in future insurance sector involvement should also be addressed.

Applicants should create synergies with projects under the same topic and other relevant ongoing or up-coming projects, notably the Horizon 2020 NBS project portfolio and its task forces; HORIZON-CL6-2021-BIODIV-01-05: The economics of nature-based solutions: cost-benefit analysis, market development and funding; HORIZON-CL6-2022-BIODIV-01-03: Network for nature: multi-stakeholder dialogue platform to promote nature-based solutions; HORIZON-CL6-2022-COMMUNITIES-01-05: Assessing the socio-politics of nature-based solutions for more inclusive and resilient communities. To this end, proposals should include dedicated tasks and appropriate resources for coordination measures, foresee joint activities and joint deliverables.

Proposals should ensure that project outputs are accessible through the Oppla portal (the EU repository for NBS)46. 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. This topic should involve the effective contribution of SSH disciplines.

Enabling transformative change on biodiversity

Topic ID and title	HORIZON-CL6-2021-BIODIV-01-16: Biodiversity, water, food, energy, transport, climate and health nexus in the context of transformative change				
Budget	EUR 5 million	**Opening date**	22 June 2021	**Deadline 1**	06 October 2021
Budget per project	EUR 5 million			**Deadline 2**	/
Type of action	Research and Innovation Actions (RIA)				
FTP subsector	F&F + Biodiversity, Policy				
Keywords	Biodiversity preservation, nature-based solutions (NSB), climate mitigation and adaptation, land use change, invasive species				
FTP comments					
FTP SIRA 2030 Challenges addressed	3			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

In line with the EU biodiversity strategy, a successful proposal will develop knowledge and tools to understand the role of transformative change for biodiversity policy making, address the indirect drivers of biodiversity loss, and initiate, accelerate and upscale biodiversity-relevant transformative changes in our society.

Proposals should look at how to further mainstream biodiversity into policy making and governance (including financing) for achieving transformative action, both under and above the scope of socio-economic and environmental agendas.

The project should address all following outcomes:

- The interlinkages (nexus) between biodiversity, water, food, energy, transport and health in the context of climate change, the underlying causes of biodiversity loss and the determinants of transformative change to achieve the 2050 vision for biodiversity are assessed.
- Options for change, showing which societal factors (including policy competences, markets and stakeholder interests) drive transformative change with a positive effect on biodiversity, and which factors drive transitions that have a negative impact on biodiversity in the short-, medium- and long-term, are identified, understood, and co-developed by the relevant actors.
- Guidance to facilitate potential just transition pathways and actions at European level to feed into systemic policy decisions. This includes guidance on how to enhance the

synergies between biodiversity preservation and action on climate-neutrality, and how to avoid trade-offs.

- Specifying the meaning of transformational change in practice, based on case studies illustrating how to put transformational change into action. Creating specific narratives, business models and policies, including on nature-based solutions for climate mitigation and adaptation, water and health, to aid the transition to a biodiversity- and climate friendly, sustainable Europe.
- Knowledge is produced (e.g. meta-studies72, publications) and made available by 2023-2024, fit for the production of IPBES assessments on transformational change and on the nexus between biodiversity, climate, water, food and health. Putting in place measures to build capacity, policy support, and science brokerage of project results, including after the release dates of the IPBES assessments, by effective and impactful dissemination.
- Scientists dispose of a network that facilitates and promotes research on transformational change for biodiversity across natural and social sciences73
- Approaches, tools and knowledge influence policies at appropriate level on transformative change for biodiversity – the key elements for this change are delivered by the portfolio of cooperating projects (of which this project forms part of).

Scope:

The European Green Deal and its biodiversity strategy call for transformative change, which requires the policy and tools to bring about transformative change. The post-2020 biodiversity goals risks to be missed from the outset if the required policy decisions are not taken and implementation is not secured. Policy makers find the task of translating science on transformative change into policy daunting and challenging. This is where European research and innovation together with the community outside academia (business, government organisations etc.) must urgently demonstrate what transformative change could actually mean and achieve for biodiversity. There is also a need for practical guidance to policy makers and society on the impacts of the necessary structural, ecological, social and economic transformations the European Green Deal could achieve.

The European Union and associated countries still need to identify the key factors in society that can stimulate or hinder this transition across the continent and share such findings with other regions of the world. This includes research into behavioural, social, cultural, economic, institutional, infrastructure, technical and technological factors.

Proposals should focus on indirect drivers of biodiversity loss: production and consumption patterns, human population dynamics and trends, trade, technological innovations, local to global governance (including financing), which in turn cause the direct drivers (land and sea use change, over-exploitation, climate change, pollution, invasive species).

With the focus on biodiversity, and links to human activity, proposals should examine how transformative change takes place in different societal and cultural contexts. They should look at what triggers these changes and what obstacles there are (behavioural, financial, policy, institutional, power setting etc). The proposals should measure and model their impact; and provide options for action (at individual, business and society level) to promote and enable transformative changes, including through nature-based solutions. Social innovation and the gender dimension should be explored when the solution is at the socio-technical interface and requires social change, new social practices, social ownership or market uptake. The proposals should should look at gender dynamics and diversity to investigate how different identities and social groups are tangibly promoting transformative changes through bottom-up transition initiatives for sustainable lifestyles that are of major relevance to biodiversity.

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) is for biodiversity and ecosystems services what IPCC is for climate change. In this context, this topic should support the upcoming IPBES assessments, expected to deliver in 2023-24, on transformational change and on the nexus of biodiversity, climate, water, food and health, with an additional focus on energy and transport. The IPBES assessment is expected to examine, inter alia:

(a) Values (relational, utilitarian, etc.) and how they influence behaviour;

(b) Notions of good quality of life, worldviews and cultures, models of interaction between nature and people and social narratives;

(c) The role of social norms and regulations, and of economic incentives and other institutions in leveraging behavioural change in individuals, businesses, communities and societies;

(d) The role of technologies and technology assessment;

(e) The role of collective action;

(f) The role of complex systems and transitions theory;

(g) Obstacles to achieving transformative change;

(h) Equity and the need for "just transitions";

(i) Lessons from previous transitions.

The project should feed input into this assessment, critically examining the usability of the IPBES conceptual framework for these aspects.

Proposals should provide case studies and collect good and failed examples, including current and business models, the role of citizen science, and scenarios that could provide useful input into these transformations and inform and inspire transformative change through learning, co-creation and dialogue.

Proposals should build their analysis on synergies between multiple Sustainable Development Goals to deliver both direct and indirect biodiversity benefits. They should also look at the role of biodiversity in reaching the set of Sustainable Development Goals, when related to the interlinkages (nexus) between biodiversity, water, food, energy, transport and health[74] in the context of climate change, the underlying causes of biodiversity loss, and the determinants of transformative change.

Proposals should include specific tasks and allocate sufficient resources to develop joint deliverables (e.g. activities, workshops, joint communication and outreach) with all projects on transformative change related to biodiversity funded under this destination. They should use existing platforms and information sharing mechanisms relevant to transformational change and to biodiversity knowledge[75]. Furthermore, cooperation is expected with the Biodiversity Partnership (HORIZON-CL6-2021-BIODIV-02-01), the Science Service HORIZON-CL6-2021-BIODIV-01-19, and the Convention on Biological Diversity and projects under 'HORIZON-CL6-2021-BIODIV-01-20: Support to processes triggered by IPBES and IPCC' and 'HORIZON-CL6-2022-BIODIV-01-10: Cooperation with the Convention on Biological Diversity'.

This topic should involve contributions from social science and humanities disciplines.

Topic ID and title	HORIZON-CL6-2021-BIODIV-01-17: Policy mixes, governance (including financing) and decision-making tools for transformative action for biodiversity				
Budget	EUR 8 million	**Opening date**	22 June 2021	**Deadline 1**	06 October 2021
Budget per project	EUR 2 to 3 million			**Deadline 2**	/
Type of action	Research and Innovation Actions (RIA)				
FTP subsector	F&F + Biodiversity, Policy				
Keywords	Biodiversity benefits, nature-based solutions (NBS), tax systems, environmental costs				
FTP comments					
FTP SIRA 2030 Challenges addressed				**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

In line with the EU biodiversity strategy, successful proposals will develop knowledge and tools to understand the role of transformative change for biodiversity policy making, address the indirect drivers of biodiversity loss, and initiate, accelerate and upscale biodiversity-relevant transformative changes in our society.

Projects should address all following outcomes:

 Tools promoting the benefits of biodiversity are taken up by policy makers, industries, civil society organisations including NGOs, financing entities, businesses and retailers. These solutions can include a stocktaking of good practice (in addition to natural capital accounting and reporting), standards, agreements, charters, commitments, regulations, financing streams (positive incentives vs harmful subsidies), engaging society and incorporating lifelong learning.

- Increased use and mainstreaming of 'green over grey' approaches, in particular by adopting nature-based solutions on land and at sea, in line with the Green Deal's 'do no significant harm' principle.
- Ways to facilitate the application of systemic, sustainable policy mixes and governance approaches, based on a range of policy tools, economic instruments or regulations.
- Developing and testing approaches on (1) mitigating existing and future risks to biodiversity and on (2) better reflecting how biodiversity loss affects company business models, value chains, profitability and long-term prospects, so that methods

and tools can be integrated into decisions, while factoring in societal and democratic processes (citizen engagement, political campaigns, science denialism).

- Making options available on how to implement in practice the renewed sustainable finance strategy for the financial system to generate a positive impact on biodiversity.
- Promoting tax systems and pricing that reflect environmental costs, including biodiversity loss, to shift the tax burden from labour to pollution, and to tackle the issue of under-priced resources and other environmental externalities.
- Making available case studies on what transformational change76 means in practice.
- Improving the understanding of the biodiversity inter-dependencies of the SDGs. Supporting IPBES and IPCC work by providing input from European research and innovation. Providing approaches, tools and knowledge influence policies at the right level on transformative change for biodiversity. The key elements for this change will be delivered by the broader portfolio of collaborative projects (of which these projects developing the toolbox for transformative changes with a positive effect on biodiversity, providing policy mixes, science-policy communication, governance and decision-making tools form part).

Scope:

Policy mixes, governance (including financing) and decision-making tools to achieve the necessary ecological, climate, economic and social transition for biodiversity are not yet widely available, and must be developed. Proposals should take up the work of the renewed sustainable finance strategy which will help ensure that the financial system contributes to mitigating existing and future risks to biodiversity.

Proposals should look at how to further mainstream biodiversity into policy making, science, and governance (including financing) to achieve transformative action within and beyond socio-economic, climate and environmental agendas.

Proposals should build their analysis on the synergies of multiple Sustainable Development Goals, to deliver direct and indirect biodiversity benefits, and on the role of biodiversity in reaching the set of Sustainable Development Goals.

Proposals should produce case studies and a collection of good and failed examples of developing and implementing policy tools, best practices and instruments, which could feed into the just transformation process and inform and inspire transformative change through learning, co-creation and dialogue.

Proposals should include specific tasks and allocate sufficient resources to develop joint deliverables (e.g. activities, workshops, joint communication and dissemination) with all projects on transformative change related to biodiversity funded under this destination. They should use existing platforms and information sharing mechanisms relevant for transformational change and on biodiversity knowledge77. Projects are expected to cooperate with the European partnership on biodiversity (HORIZON-CL6-2021-BIODIV-02-01) and the Science Service (HORIZON-CL6-2021-BIODIV-01-19). Proposals should show how their results and outcomes could provide timely information for major science-policy bodies such as the Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services (IPBES), the Intergovernmental Panel on Climate Change (IPCC), and the Convention on Biological Diversity78.

This topic should involve contributions from the social sciences and humanities disciplines.

Interconnecting biodiversity research and supporting policies

Topic ID and title	HORIZON-CL6-2021-BIODIV-01-19: A mechanism for science to inform implementation, monitoring, review and ratcheting up of the new EU Biodiversity Strategy for 2030 ("Science Service").				
Budget	EUR 13 million	**Opening date**	22 June 2021	**Deadline 1**	06 October 2021
Budget per project	EUR 11 to 13 million			**Deadline 2**	/
Type of action	Coordination and Support Action (CSA)				
FTP subsector	F&F				
Keywords	Knowledge Centre for Biodiversity (KCBD), EU Biodiversity Strategy for 2030, Science Service, indicators, knowledge gaps, Environmental Knowledge Community (EKC)				
FTP comments					
FTP SIRA 2030 Challenges addressed	3E			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

The project is expected to connect up biodiversity research across Europe, supporting and enhancing the ambition of national, European and international environmental policies and conventions.

Contributing to the EU biodiversity strategy for 2030, the aim of this topic is to give support for developing and implementing this and other EU policies by generating knowledge generation, guiding biodiversity governance and ecosystem monitoring, and implementing the EU Green Deal. It supports the development of a long-term strategic research agenda for biodiversity.

The project results are expected to contribute to all of the following expected outcomes:

- a single entry point linking European research and biodiversity policymaking that will be embedded in the EC Knowledge Centre for Biodiversity (KCBD) as 'scientific pillar', which will collect and organise knowledge resulting from science that is relevant for implementing the EU biodiversity strategy and other relevant EU policies, in particular knowledge generated from EU-funded R&I projects, relevant infrastructures and platforms.
- feeding input into the monitoring, reporting and review mechanism of the EU biodiversity strategy for 2030 with relevant research-based assessments and options

that can feed into any short- and medium-term corrective action necessary ("ratcheting up").

- full integration into, and support to the governance framework of the EU biodiversity strategy for 2030 to steer implementation of the commitments on biodiversity agreed at national, European or international level
- setting up a functional, early delivering Science Service at EU level, also involving associated countries where appropriate, to bolster at global level the EU's ambitions for research into biodiversity-relevant areas.

Scope:

The EU biodiversity strategy for 2030 announced a science policy mechanism for research-based options to ratchet up the implementation of commitments made on biodiversity. This topic is to provide a Science Service as a dedicated tool to regularly integrate science into EU biodiversity policy-making in terms of what is needed to implement the strategy. It should bridge the continued and critical gap on knowledge sharing and should complement other EU-funded initiatives82. It should feed into the EC Knowledge Centre for Biodiversity83. At the same time, it should provide a single-entry point linking RTD funded research and innovation with biodiversity policymaking via the EC Knowledge Centre for Biodiversity. Further, the Science Service might act as a pilot on how any science component could work in practice in the context of the post-2020 Global Biodiversity Framework. With this work, Europe could test and lead the way on how to make such an instrument, triggering research-based options to implement the biodiversity strategy, work in practice.

The objective is to reformat and connect research results to the needs of environmental policy in a targeted dialogue between science and policy makers. This should include science resulting from the latest EU R&I activities and infrastructures, shape future R&I and be embedded in the long-term strategic research agenda on biodiversity. Proposals should develop a Science Service mechanism that covers all of the following aspects:

a. Inspired by IPBES functions, it should provide relevant policy tools (e.g. indicators), generate knowledge to fill gaps, build capacity within and beyond the EU, and contribute to science-based assessments for the EU decision-making process.

b. All work carried out by the Science Service should be defined under strong and clear governance arrangements, including how to prioritise requests, and designed to support implementing, monitoring, reporting and reviewing the EU biodiversity strategy. The governance should be led by DG RTD, in cooperation with DG ENV, DG

JRC and the EEA, and ideally involve the Environmental Knowledge Community (EKC)84 and factor in its needs and requests.

c. The Science Service should feed into the EC Knowledge Centre on Biodiversity85 and support it to direct knowledge gaps and policy questions to science, synthesize knowledge, and communicate emerging issues identified by science to decision-makers in policy, business, NGOs, land users or site managers. The Science Service should also be involved and feed knowledge into strategic dialogues and fora organised by the EC Knowledge Centre for Biodiversity, as well as in expert meetings requested by the EKC. The Knowledge Centre on Biodiversity should manage exchanges from policy to science and vice-versa, and the Science Service constitutes its primary tool for making scientific information accessible to policy makers.

d. Member States, and where appropriate associated countries, civil society and the Mission Boards under Horizon Europe, may also ask the Science Service to cover specific topics. The process of directing requests for contents and format to the Science Service, and how to provide information, is to be agreed with the relevant EU services, including with the EC Knowledge Centre for Biodiversity.

e. The Science Service should use the tools and results funded by the EU research framework programmes86, by other sources of European funding87, and additional relevant sources88, which it should help integrate into the EC Knowledge Centre for Biodiversity. It should cooperate with the European partnership on biodiversity89.

f. The Science Service should take up requests from biodiversity policy-making to the Biodiversity Partnership, and to the biodiversity-relevant missions in Horizon Europe. This would be orchestrated in collaboration with the EC Knowledge Centre for Biodiversity; such as via its user forum function. The Science service should also organise ad-hoc high-level expert advice to the European Commission's high-level decision-makers on specific issues related to biodiversity.

g. The work of the Science Service should be presented and discussed at expert or working groups according to the governance framework of the EU biodiversity strategy, and should support European research policy related to biodiversity. It should also act as a 'back office' for organising the cooperation of biodiversity-relevant research projects – in thematic clusters where appropriate – under Horizon Europe and Horizon 2020, such as yearly meetings or through common products, in

collaboration with the Executive Agency. This would be done in collaboration with the EC Knowledge Centre for Biodiversity.

h. The Science Service should support the orchestration of current and future knowledge mechanisms to implement the long-term European strategic biodiversity research agenda, including work under the Biodiversity Partnership and other biodiversity-relevant partnerships; such as EKLIPSE, Oppla, NetworkNature, the EC Knowledge Centre for Biodiversity90 and other biodiversity-relevant science advisory mechanisms. It should also describe the global aspects of its services in the mid-term planning.

i. Proposals should indicate what specific results the Science Service should initially deliver by the end of year one. This pilot exercise should be relevant to and fit the timeframe set out in the policy agenda of the EU biodiversity strategy, and optionally, for the global biodiversity agenda. Throughout the duration of the project, the following annual work plans should be aligned to the long-term strategic research agenda (in preparation - See EU biodiversity strategy).

j. The Service should then deliver, communicate and disseminate regular (e.g. half-yearly) input in the form of options and scenarios for implementing the biodiversity strategy for 2030 and beyond. The aim must be to trigger response from those entities responsible for implementing the strategy (e.g. EU services, national and local authorities, business, civil society and the environmental knowledge community in general).

k. It should provide, on request of its governance bodies, summaries, knowledge synthesis, factsheets or briefs and reviews of biodiversity research outputs and tools usable for implementing and ratcheting up the EU biodiversity strategy, in language and format tailored to the target users, such as:

    i. foresight, analysis of new and emerging topics,

    ii. indicators and valuation methods,

    iii. analysis of the behavioural, institutional and bio-physical factors for biodiversity conservation and restoration, including on tipping points and planetary boundaries,

    iv. projections/forecasts, integrated models, scenarios and pathways that integrate socio-economic and cultural values, that avoid lock-in pathways, and

that provide incentives for large-scale demonstration of nature-based solutions and testing of governance approaches, financing and business models to enable transformative change,

v. requests to existing science-policy services (such as EKLIPSE and Oppla) in collaboration with the EC Knowledge Centre for Biodiversity for dedicated biodiversity-relevant science-policy tasks that those services can deliver, and that the Science Service channels into the biodiversity governance framework,

vi. support for science-based decision-making for biodiversity against disinformation campaigns; and

vii. testing new ways of communicating biodiversity-related science to non-scientific audiences.

l. Proposals should describe how the Science Service can deliver its work in line with the timeframe for policy processes and to implement the EU biodiversity strategy. They should explain how they have sufficient resources, and a flexible, lean mechanism following the principles of credibility, relevance and legitimacy, including whether internal assessments or peer reviews on its outputs are planned.

m. Proposals should evaluate the experience of comparable instruments covering some of the actions or procedures that the Science Service should set up91, focused on biodiversity but also in other fields, and under the governance framework of the EU biodiversity strategy.

n. The project should draw up a plan on how to finance and govern the activities of this kick-starting service over the medium- and long-term and seek to secure commitments to allow the work of the Science Service to continue after the funding of this topic ends, i.e. before 2027.

Proposals should strike an appropriate geographical balance across Europe.

This topic should involve contributions from the sciences and humanities disciplines.

Call – Biodiversity and Ecosystem Services 2022

Interconnecting biodiversity research and supporting policies

Topic ID and title	HORIZON-CL6-2022-BIODIV-01-10: Cooperation with the Convention on Biological Diversity				
Budget	EUR 5 million	**Opening date**	28 October 2021	**Deadline 1**	15 February 2022
Budget per project	EUR 5 million			**Deadline 2**	/
Type of action	Coordination and Support Action (CSA)				
FTP subsector	F&F				
Keywords	scientific and technical cooperation, Convention on Biological Diversity (CBD), IPBES, CBD monitoring framework, policy biodiversity knowledge				
FTP comments					
FTP SIRA 2030 Challenges addressed				**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

In line with the Commission priority 'A stronger Europe in the world', to implement the EU Green Deal and demonstrated leadership as outlined in the EU biodiversity strategy for 2030, a successful proposal will increase the European support to the Convention on Biological Diversity.

The project results must contribute to all of the following expected outcomes:

- A dedicated mechanism for scientific and technical cooperation of the EU and associated countries with the Convention on Biological Diversity (CBD) delivers support for its working groups and task forces, and for the respective subsidiary bodies (including the Informal Advisory Group on Technical and Scientific Cooperation).
- Improved coherence in how the EU and associated countries contribute to CBD (e.g. SBSTTA/SBI) and to IPBES processes in cooperation with HORIZON-CL6-2021-BIODIV-01-20: Support to processes triggered by IPBES and IPCC.

Scope:

- Research on biodiversity and nature-based solutions has made good progress in the last years, but must be stepped up to achieve targeted impacts on biodiversity-relevant policies. Global initiatives, in turn, should provide structured policy input into

the research cycle. This is also key to guiding biodiversity governance, and to implement the EU Green Deal and international conventions. In line with the Commission priority 'A stronger Europe in the world', the EU must demonstrate leadership in this field, notably by increasing its support to the Convention on Biological Diversity.

- The proposals should cover all the following points
- Deliver a dedicated mechanism for scientific and technical cooperation of the EU and Associated Countries with the Convention on Biological Diversity (CBD) for its Informal Advisory Group on Technical and Scientific Cooperation.
- In cooperation with the EC Knowledge Centre for Biodiversity, deliver on the European technical and knowledge contribution to a global biodiversity platform for biodiversity, and support the implementation of the CBD monitoring framework (including in collaboration with EU and national monitoring initiatives and the Biodiversity Indicators Partnership),
- Improve biodiversity knowledgeto better understand gaps in global biodiversity action and to identify the needs for stepping (“ratcheting”) up biodiversity commitments and action.
- Engage and support European researchers participating in CBD working groups and task forces, and the CBD’s subsidiary bodies, and provide this expertise to UNFCCC processes.
- Provide technical and scientific support to negotiators from the EU and associated countries in preparing and at SBSTTA/SBI meetings and CBD COPs.
- Share relevant information so that the EU can lead and cooperate on worldwide research, which includes targeted capacity building for central and eastern European and associated countries.
- Proposals should indicate which specific tasks they plan to deliver at the end of year one. This should be relevant and timely for the policy agenda of the Global Biodiversity Agenda, and for the international dimension of the EU biodiversity strategy.
- Proposals should then deliver regular (e.g. every six months) input according to the agenda of SBSTTA and SBI to the EC services, and continuous support for the Working/Advisory Groups under CBD, in cooperation with the Science Service

(HORIZON-CL6-2021-BIODIV-01-19: A mechanism for science to inform implementation, monitoring, review and ratcheting up of the new EU biodiversity strategy for 2030 (“Science Service”), the Biodiversity Partnership, and further relevant instruments, tools and mechanisms129. Its results, where relevant, should be accessible through the EC Knowledge Centre for Biodiversity, according to agreed standards. Proposals should outline sufficient resources for such cooperation and contribute to the strategic dialogues into the KCBD forum.

Destination 3 : Circular economy and bioeconomy sectors

Call – Circular economy and bioeconomy sectors 2021

Enabling a circular economy transition

Topic ID and title	HORIZON-CL6-2021-CircBio-01-01: Circular Cities and Regions Initiative (CCRI)'s circular systemic solutions				
Budget	EUR 21,5 million	**Opening date**	22 June 2021	**Deadline 1**	06 October 2021
Budget per project	EUR 5 to 10 million			**Deadline 2**	/
Type of action	Innovation Actions (IA)				
FTP subsector	WW, P&P				
Keywords	Circular bioeconomy, circular systemic solutions, GHG emissions, demonstration project, local resources, business opportunities, waste management, packaging, plastics, textiles, construction, buildings, nature-based solutions (NBS)				
FTP comments					
FTP SIRA 2030 Challenges addressed	4			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	6-8

Expected Outcome

Successful proposals will support the delivery of solutions to implement the European Green Deal, the circular economy action plan 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.

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)206. Proposals are expected to provide policy-makers, public and private investors and local communities with concrete and demonstrated examples of circular systemic solutions. In the context of this topic, a circular systemic solution is defined as a 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 economic sector.

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

- Improved circularity and reduced GHG emissions in economic sectors, natural ecosystems, and efficient valorisation of local resources in cities, regions or their groupings.

- Creation of business opportunities in the circular economy at urban and/or regional scale.
- Increased circular and climate-neutral practices among citizens and their participation in circular systemic solutions.
- 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
- Creation of jobs in the short to medium-term perspective.
- More effective widespread uptake and easier replication, scalability and visibility of circular systemic solutions and hence multiplication of their economic, social and environmental benefits to achieve 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:

Proposals are expected to implement and demonstrate circular systemic solutions for the deployment of the circular economy (including the circular bioeconomy) in cities, regions or their groupings.

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 governance models and support the active participation of all relevant actors in cities, regions or their groupings. Examples of relevant actors are: public administrations and utilities; private sector services and industries, including small and medium enterprises (SMEs); 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 may consider applying the circular economy principle not only to waste and water management, but also to other sectors including, for example, one or more of the new circular economy action plan key product value chains, i.e.: batteries and vehicles, electronics and ICT, packaging, plastics, textiles, construction and buildings, food, water and nutrients.207 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

groupings' 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 experimented 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 will 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 weaknesses experienced.

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. In particular, cooperation and complementarity should be ensured with the projects under the European Green Deal Call's topic 'LC-GD-3-2-2020 - Demonstration of systemic solutions for the territorial deployment of the circular economy'.208

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 2022 two-stage

Innovating sustainable bio-based systems and the bioeconomy

Topic ID and title	HORIZON-CL6-2022-CircBio-02-05- two-stage: Life sciences and their convergence with digital technologies for prospecting, understanding and sustainably using biological resources				
Budget	EUR 12 million	**Opening date**	28 October 2021	**Deadline 1**	15 February 2022
Budget per project	EUR 6 million			**Deadline 2**	1 September 2022
Type of action	Research and Innovation Actions (RIA)				
FTP subsector	Bioinformatics				
Keywords	Artificial Intelligence (AI), biological resources, digital tools, biosensors, climate change adaptation, industrial processes sustainability, bio-based sector, engineering biology, machine learning, synthetic biology, bio computer-aided design (BioCAD)				
FTP comments					
FTP SIRA 2030 Challenges addressed	2B			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	4-5

Expected Outcome:

In line with the European Green Deal and other European initiatives such as the circular economy action plan, the industrial strategy, the bioeconomy strategy and the biodiversity strategy, the successful proposal should support the uptake of bio-based innovation, to improve European industrial259 sustainability, competitiveness and resource independence. They should develop innovative bio-based products using the full benefits of artificial intelligence and other digital technology innovation. They should engage all stakeholders and improve their knowledge and understanding of science, notably biotechnology-based value chains, and improve benefits for consumers.

Project results tshould contribute to all of the following outcomes:

- Use the full potential of artificial intelligence applications for prospecting, understanding and sustainably using biological resources within safe planetary boundaries.
- Digital tools, sensors and methods for improved efficiency, climate change adaptation and sustainability of industrial processes in the bio-based sectors considering the needs of stakeholders are integrated in innovative engineering solutions.
- Enhanced monitoring, reporting and management of natural resources using artificial intelligence and other digital technology applications.

Scope:

Engineering biology applications have grown beyond chemical production to include the generation of biosensor organisms for the lab, animal, and field, modification of agricultural organisms for nutrition and pest/environmental resilience, production of organisms for bioremediation, and live cell and gene/viral therapies. The rapid expansion of the field has resulted in new tools and new approaches. However, we are still challenged by the need for novel and more robust and interoperable computational tools and models for engineering biology. For example, improved models of synthetic systems (synthetic biology) and of their interaction with their host organisms could help enable more successful engineering.

This information infrastructure for biological design is at an early stage compared to engineering disciplines such as mechanical and electrical engineering, as the biomanufacturing field has emerged only recently. A critical bottleneck is a lack of established "design rules," core aspects of biological and biomolecular function that apply to diverse systems and applications. Furthermore, technologies for the utilization, manufacture, and deployment of innovative bio-based systems are still under development. These roadblocks have hampered the development of standard computational frameworks to represent, process and store information on biological components, predict system behaviour, and diagnose failures. Therefore, widespread automation in the bio-based sectors remains out of reach.

A mature computational infrastructure for biodesign requires powerful access to information on biological parts and systems, their environments, their manufacturing processes, and their operations in and beyond the laboratory in which they are created. This in turn requires findable, accessible, interoperable, and reusable data that enable effective aggregation information on bio-based systems, their environments, and their processes of manufacture, and the establishment of standard models of data processing and analysis, including bioinformatics, biosensors, bioindicators, '-omics' technologies that allow open-development and scalable execution in the bio-based sectors.

The topic aims to prevent pollution and sustainably manage and use natural resources within safe planetary boundaries, including in the deployment of the bioeconomy and the bio-based sectors. The topic focuses on bioinformatics, "cheminformatics" and artificial intelligence as approaches and tools to transform available information into biologically or biotechnologically applicable knowledge. It also aims to efficiently integrate digital technologies into bio-based operations to optimise value chains from a technical, economic, social and environmental point of view.

Proposals should:

a. Enable prospecting, understanding and sustainable use of biological resources based on their convergence with digital technologies that lead to optimised and more efficient bio-based operations.

b. Identify and characterise advanced technologies, including artificial intelligence, and their benefits for the utilisation, manufacture, and deployment of innovative bio-based systems.

c. Develop integrated biological designs and data models for improved prospecting, understanding and deployment of higher efficiency and sustainability of biological resources and industrial bio-based operations (e.g. bioinformatics, biosensors, bioindicators, data analysis, '-omics' technologies).

d. Improve the economic and environmental sustainability of bio-based operations.

e. Focus on the integration of -omics and machine learning techniques such as active learning for the design-build-test-learn (DBTL) cycle.

f. Develop improved models and model standards of synthetic systems (synthetic biology) and of their interaction with their host organisms to facilitate more successful engineering and broader application in the bio-based sectors.

g. Establish bio computer-aided design (BioCAD) tools and design-of-experiment (DoE) approaches.

h. Reinforce and maintain scientific infrastructures to integrate existing biodiversity information (species, habitats and environmental processes).

i. Consider contributing data and results to the European Commission's Knowledge Centre for Bioeconomy hosted by the JRC.

For this topic, it is not mandatory to integrate the gender dimension (sex and gender analysis) into research and innovation.

Destination 4: Clean environment and zero pollution

Call – Clean environment and zero pollution 2021

Increasing environmental performances and sustainability of processes and products

Topic ID and title	HORIZON-CL6-2021-ZEROPOLLUTION-01-08: New genomic techniques (NGT): understanding benefits and risks – focus on bio-based innovation				
Budget	EUR 5 million	**Opening date**	22 June 2021	**Deadline 1**	06 October 2021
Budget per project	EUR 5 million			**Deadline 2**	/
Type of action	Research and Innovation Actions (RIA)				
FTP subsector	Gene Editing				
Keywords	Environmental balance, biodiversity impacts, bio-based sectors, biotechnology, bio-based innovation, medical application, biorefinery, reuse, reprocessing, sustainable biomass				
FTP comments					
FTP SIRA 2030 Challenges addressed	2A - 6			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	4-5

Expected Outcome

The successful proposal will contribute to Destination 'Clean environment and zero pollution' impacts, and European policies it supports, in particular the European Green Deal, the circular economy action plan and the bioeconomy strategy, and specifically in respect to circular bio-based systems in industrial sectors along value chains and supply chains of biological feedstock, within Europe and globally, as well as to delivering the innovative "zero-pollution" bio-based biotechnology solutions.

Project results should contribute to all of the following outcomes:

- Improved understanding of the benefits and risks of new genomic techniques applied for plants274 and/or animals275 and microorganisms and consequences for human health and the environment (e.g. environmental balance, biodiversity impacts), aiming at a holistic approach276.
- Advancing the potentials of the new genomic techniques (via technical and social innovation)
- Contribution to an improved and more inclusive understanding and awareness, through transparent communication of the risks and benefits of the new genomic techniques and resultant innovation, while supporting societal dialogue and

engagement with all stakeholders (academia, industry, including SMEs, NGOs, regulatory institutions, international partners and consumers or civil society to ensure public knowledge and awareness).

Scope

There is a need to enable major advances in the life sciences and biotechnology, in new genomic techniques, such as gene/genome editing277. This aims to ensure they can contribute safely and sustainably addressing the grand societal challenges of our age, such as climate change mitigation and adaptation, improved resource efficiency by industry and throughout various sectors of the economy. This covers their applicability for bio-based sectors (e.g. development of improved and more resilient feedstocks, plants and livestock to achieve a more efficient use of resources, longer shelf life of the agricultural products, products or agricultural by-products rendered more reusable). These advances must be aligned with the relevant EU legal framework278, while aiming to support the climate ambition of zero net emissions by 2050, as well as biodiversity protection and resource efficiency goals. A key aspect should be the combination of safety, environmental sustainability and functionality of the developed products. It needs to recognize the need for a holistic approach at the ecosystem level, for both conventional and alternative production systems. R&I activities should result in solutions to develop safe and more environmentally friendly products, allowing for innovation, transparency and inclusiveness for all actors.

International cooperation is strongly encouraged, to exchange best practice, while contributing to the European competitiveness.

Proposals should:

a. Advance new genomic techniques in bio-based innovation (purely medical applications such as the therapeutical/clinical applications are excluded), to understand and increase their impact, as related, for instance, to the origin of feedstocks and its other features and its applicable conversion pathways (e.g. via biorefinery processing), storage, logistics, enhanced functionalities and environmental sustainability, safety/non-toxic nature and improved end-of-life behaviour (e.g. reuse/reprocessing), etc. for specific applications.

b. Develop future scenarios taking into account in different environmental, social and economic drivers, to assess potential critical impacts and bottlenecks with respect to the EU and international governance frameworks. This should take into account the expected demand of primary resources needed to satisfy the growing bio-based economy (especially

sustainable biomass), the need to protect and restore biodiversity, as well as the increasing environmental pressures under climate change conditions.

c. Develop new approaches to design innovative aspects of the production process, screening procedures, molecular tools and digital applications.

d. Outline the necessary scale-up production processes for novel bio-based innovations in order to reach a critical mass for a given application, to achieve economies of scale, address different market segments and applications, etc.

e. Ensure transparent and inclusive engagement of all actors, including industry and SMEs, scientific community, regulatory institutions, and broader civil society, to ensure necessary impact.

f. Where relevant, proposals should seek synergies and capitalise on the results of past and ongoing research projects.

For this topic, it is not mandatory to integrate the gender dimension (sex and gender analysis) into research and innovation. This topic should involve the effective contribution of SSH disciplines.

Destination 6: Resilient, inclusive, healthy and green rural, coastal and urban communities

Call – Resilient, inclusive, healthy and green rural, coastal and urban communities 2021

Topic ID and title	HORIZON-CL6-2021-COMMUNITIES-01-01: Grasping rural diversity and strengthening evidence for tailored policies enhancing the contribution of rural communities to ecological, digital and social transitions				
Budget	EUR 15 million	**Opening date**	22 June 2021	**Deadline 1**	06 October 2021
Budget per project	EUR 7 to 7,5 million			**Deadline 2**	/
Type of action	Research and Innovation Actions (RIA)				
FTP subsector	Rural communities				
Keywords	policies, governance, rural situations diversity, functional characteristics of territories, synergistic approaches				
FTP comments					
FTP SIRA 2030 Challenges addressed	7			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

The successful proposal will contribute to fostering a sustainable, balanced and inclusive development of rural areas, supporting the implementation of the European Green Deal311, in particular its fair and just transition component, the European digital strategy312, the European pillar of social rights313 and the EU long-term vision for rural areas314. It will do so by improving the understanding of the environmental, socio-economic, behavioural, cultural and demographic drivers of change in rural areas. Stronger evidence on which to build their strategies and initiatives will empower rural people to act for change and get prepared to achieve climate neutrality by 2050, adapt to climate change, and turn digital and ecological transitions into increased resilience, good health and positive long-term prospects, including jobs, for all including women, young people and vulnerable groups.

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

- more evidence-based, place-based, integrated and tailored policies, strategies and governance frameworks at local, regional, national and EU levels to drive the

sustainable transition of rural areas and communities, building on the specific outcomes below;

- a refined understanding by policy-makers and rural actors of the diversity of rural situations, and of the challenges and opportunities associated with megatrends, potential major shocks and upcoming transitions, in particular climate, environmental and social challenges, to tailor policy interventions to local realities;
- a refined understanding by policy-makers and rural actors of functional characteristics of territories, functional relations between rural places and other rural and/or urban places within a territorial continuum and the importance of these relations for sustainable development, to design synergistic approaches favouring a networked and interlinked development; and
- a refined assessment by policy-makers of the impact of all current and upcoming policies on rural communities (rural proofing315), including sectoral or thematic policies (such as climate, energy, mobility, digitalisation, health and social inclusion), or policy frameworks designed to accompany sustainability transitions in general, to tailor interventions to maximise possibilities for rural communities to contribute to and benefit from these transitions.

Scope:

The EU aims to lead just digital, economic and ecological transitions that will leave no one behind. Close to one third of EU citizens live in rural areas, which represent 83% of the EU territory and supply the whole of society with essential goods and services. These broad figures hide a variety of situations, challenges and opportunities regarding the aforementioned transitions that the current evidence base insufficiently captures.

The design of positive governance frameworks and policy interventions for rural communities is hampered by i) the lack of conceptual frameworks that properly grasp the role of rural areas and communities in sustainable development and sustainability transitions; ii) a lack of data on several aspects at the right geographic scale, in particular on climate and environment performance and on social challenges, quality of life and well-being. The lack of data at the right geographical scale (local in many cases) is hampered by the technical and economic difficulties of finer data collection.

Proposals should explore innovative and out-of-the box ways to describe and characterise rural areas or various forms or degrees of rurality in multi-dimensional ways, screening a wide range of possible (including new) data sources going beyond conventional indicators such as population density and settlement configuration. They should analyse national and

other definitions and approaches and engage with stakeholders to understand their perspectives on rurality. Proposals should define and describe functional linkages between various localities and territories and explore and develop ways to apply functional geography approaches to rural areas (e.g. developing the concept of functional rural area), learning from past work316 and failures on such approaches. Trade-offs in selected approaches should be analysed in regional and national contexts highlighting geographical differences.

Proposals should screen and benchmark the performance and cost efficiency (infrastructure needs, ease and frequency of updates etc.) of data collection methods and technologies including new ones (e.g. digital technologies, geolocation and geospatial techniques, crowd sourcing, citizen science) that could be used to collect the necessary rural data at the local level across a majority of EU Member States and Associated Countries in Europe, at affordable costs and select viable options for testing these options. They should strengthen rural evidence and rural data collection, documentation and access, in particular in the environmental, climate and social fields by generating data and designing, testing and implementing methods to:

- calculate climate and environmental indicators for rural communities, including rural dwellers and secondary-homers;
- upgrade socio-economic (including culture) assessment, analysis, monitoring and evaluation tools (stats, indicators, including the measurement of well-being, quality of life and attractiveness including gender and age differences);
- assess resilience to major threats, with particular emphasis on resilience and vulnerability factors under the COVID-19 pandemic.

This should result in enriched, upgraded and regularly updated platforms, data and indicators mapping, describing and monitoring economic (including sectors, jobs and income), social (including quality of life and well-being) and environmental (including climate mitigation and adaptation and energy) characteristics of rural areas and communities at sub-regional, local or functional levels, contributing to relevant actions of the long-term vision for rural areas in this domain. The analysis carried out should help to grasp the diversity and specificity of rural places in the EU and Associated Countries, their inter-relations, their preparedness for transitions, major shocks and megatrends, their capacity to take advantage of these trends in adaptive and resilient ways.

Proposals should benchmark climate and environmental policies and existing frameworks to describe and measure well-being, quality of life and attractiveness, assess their relevance

for rural areas and communities and make recommendations for adapting these frameworks. They should in particular propose innovative schemes to reach climate neutrality by 2050 while taking advantage of the ecological transition and preserving ecosystems (nature-based solutions), landscapes etc. Finally, they should support rural proofing317 by developing tools completing those already existing on territorial impacts (e.g. under the EU Better Regulation318), to assess the impact of EU policies and programmes on rural areas and communities.

Proposals must implement the multi-actor approach, bringing together from the start multiple types of scientific expertise in both hard sciences (e.g. climate, energy, and environment) and social sciences and humanities (e.g. geography, sociology, behavioural sciences, policy, foresight) together with a variety of rural community representatives. This topic should involve the effective contribution of SSH disciplines. Projects outputs should be scalable at least to the EU as a whole, hence they should be developed using data from a representative diversity of rural contexts across the EU. Proposals should strengthen evidence on rural areas and communities in a multi-dimensional way (proposals focused on one particular sector -e.g. primary production- or dimension of sustainability would not be considered as addressing the challenge appropriately). Proposals should engage with both national authorities and rural communities on their understanding of rurality and on project developments. Proposals should foresee a task to work jointly with other projects funded under this topic and with the European Commission, its common agricultural policy319 networks320 and other relevant networks (e.g.: future Farm Sustainability Data Network (FSDN)321) and projects (including research projects322) contributing to building rural evidence.

The possible participation of the JRC in the project will consist of connecting project activities to on-going work on integrated territorial strategies and or various domains mentioned in the topic to ensure complementarities and synergies, in particular advising on the data collection methods to be tested and on filling-in data gaps at high spatial granularity (NUTS3, LAU or grid levels). The contribution is framed on the context of the Knowledge Centre for Territorial Policies.

Destination 7: Innovative governance, environmental observations and digital solutions in support of the Green Deal

Call – Innovative governance, environmental observations and digital solutions in support of the Green Deal 2021

Innovating with governance models and supporting policies

Topic ID and title	HORIZON-CL6-2021-GOVERNANCE-01-07: Regional governance models in the bioeconomy				
Budget	EUR 5 million	**Opening date**	22 June 2021	**Deadline 1**	06 October 2021
Budget per project	EUR 2,5 million			**Deadline 2**	/
Type of action	Coordination and Support Actions (CSA)				
FTP subsector	Bioeconomy				
Keywords	regional/local strategies, participatory approaches, feedstock, biorefineries, local bio-based economy, bioeconomy transition, ecosystem services, sustainable biomass production, upcycling, bio-base products, policy mix				
FTP comments					
FTP SIRA 2030 Challenges addressed	3E			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

Successful proposals 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, in particular the European Green Deal, and EU bioeconomy strategy, by supporting the establishment of the innovative governance models notably to achieve better-informed decision-making processes, social engagement and innovation. In addition, the topic supports the strengthened EU and international science-policy interfaces to achieve the Sustainable Development Goals.

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

- Creation of a supporting governance structure and related capacities for regional authorities, contributing to the Circular Cities and Regions Initiative (CCRI)390 and aiming at developing comprehensive and innovation- and sustainability-driven bioeconomy strategies.

- Support to local economic and implementing authorities, including at bioeconomy clusters' level, to improve engagement of regional and local actors, considering hierarchy of use, trade-offs, synergies, business models, participatory approaches etc. with improved environmental, social and economic impacts.
- Support to the development of regional/local strategies, aiming at exploiting and developing balanced local potentials and innovation (in terms of feedstock, infrastructures (e.g. biorefineries) for logistics, services and production, investments) within the framework of local development and investment as well as environmental protection plans.
- Integration of the opportunities created by the local bio-based economy within broader bioeconomy transition, e.g. by linking ecosystem/nature services' valorisation with sustainable biomass production, processing, product design and manufacture, circular use and upcycling to new applications.
- Development of the best practice guidelines for local operators and innovation developers, supporting climate-neutrality and low environmental footprint improvements of bio-based products and services;
- Development of novel business models and related social measures to enable consumers, industry and public bodies to switch to socially and environmentally responsible behaviour within their choices (e.g. regulatory measures, corporate responsibility initiatives, education); ensuring synergies, transparency and inclusiveness of all actors;

Scope:

Improved and informed governance including social innovation contributes to reducing resource consumption and results in an increased innovation capacity of all actors, and reducing the risk of leaving anyone behind. This should take into account the regional and local peculiarities, including feedstock availability, industrial development, consumption patterns, market measures and available investment streams (financial models), while ensuring effective sharing of best practices across European regions. This also helps to advance innovation at local scale and engage all actors.

This action should support the implementation of sustainable bio-based value chains, in regional settings (toolbox of instruments including strategies, plans and programmes, including the social dimension). Proposals should benefit from social creativity and opportunities at regional scale unleashed for bio-based systems, ensuring their low

environmental footprint, and providing for its operational verification. Robust environmental protection plans should underpin the effort undertaken.

The local dimension refers to regional scales, in terms of rural/urban/coastal areas, to be identified/defined in their specific characteristics to act as optimal frameworks for coherent and replicable strategies of bio-based systems. The proposals should seek complementarities with related actions391 on the governance of bio-based innovation and ensure inclusiveness and the engagement of all actors.

Proposals should:

a. Analyse and structure the regional bioeconomy-related policy mix (e.g. regional operational programmes, bioeconomy strategies under the common agricultural policy instruments, innovation action plans, business models, environmental protection plans) to understand the potentials, bottlenecks, and opportunities, capacities etc. for feedstocks, infrastructure, investment, human skills, innovation actors (including community knowledge) etc. to enable sufficient impacts/benefits/positive trade-offs and performances of the specific bioeconomy/bio-based value chains;

b. assess existing/develop a new policy monitoring system and key performance indicators of the effectiveness and robustness of existing governance schemes, to allow replication across Europe (e.g. income generation for all stakeholders, labour conditions, environmental indicators, social engagement, innovation parameters etc);

c. ensure efficient exchange of best practice and engagement of all actors (regional and local authorities, SMEs, civil society organisations including NGOs, knowledge providers) via robust and transparent communication and awareness-rising campaigns;

d. analyse social and economic barriers and potentialities to enable the transition towards socially and environmentally responsible behaviour within all ranges (e.g. regulatory measures, corporate responsibility initiatives, education), ensuring inclusiveness of all actors (NGOs, civil society etc, considering gender and age, where relevant.)

Topic ID and title	HORIZON-CL6-2021-GOVERNANCE-01-08: Improving understanding of and engagement in bio-based systems with training and skills development				
Budget	EUR 5 million	**Opening date**	22 June 2021	**Deadline 1**	06 October 2021
Budget per project	EUR 2,5 million			**Deadline 2**	/
Type of action	Coordination and Support Actions (CSA)				
FTP subsector	Bioeconomy				
Keywords	Training programmes, bioeconomy, bio-based sector, co-creation, social innovation, feedstock, local development, climate-neutrality, wood, bio-textiles, bio-composites, 3D printed biomaterials				
FTP comments					
FTP SIRA 2030 Challenges addressed				**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome

Successful proposal(s) 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, in particular the European Green Deal and EU bioeconomy strategy, by supporting the establishment of the innovative governance models notably to achieve better-informed decision-making processes, social engagement and innovation. In addition, the topic supports the strengthened EU and international science-policy interfaces to achieve the Sustainable Development Goals.

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

- Creation of guidelines for training and mentoring programmes in specific European regions and local communities, on knowledge and skills useful in the bioeconomy, and in particular bio-based sectors.
- Increased awareness, understanding and engagement of all actors (especially stakeholders involved in adult learning, retraining and skills' development) with focus on co-creation, and social innovation.
- Support to the local balanced local potentials and innovation (in terms of feedstock, infrastructures, capacities) within the framework of local development and investment as well as fostering sustainability-driven policy.
- Integration of the opportunities created by the human-centric principles, offered by art, culture and (eco)-design, in respect to the bio-based feedstocks, including traditional and novel biological materials.

- Support to the feedback loops from the society to the policy makers, by developing the best practice guidelines for local operators and innovation developers, supporting climate-neutrality and low environmental footprint improvements of bio-based products and services;
- Development of skills leading to the novel business models and related social measures to enable consumers, industry and public bodies to switch to socially and environmentally responsible behaviour within their choices (e.g. regulatory measures, corporate responsibility initiatives, education); ensuring synergies, transparency and inclusiveness of all actors.

Scope

Improved and informed governance including social innovation contributes to reducing resource consumption and results in an increased innovation capacity of all actors, and reducing the risk of leaving anyone behind. This should take into account the need to promote social engagement, supporting the permanent learning and re-training, in the area of bio-based economy.

This needs to take into account local specificities, such as the sustainable biological resources available (both traditional materials such as wood, cork or straw), but also innovations such as sustainable bio-textiles, bio-composites, 3-D printed biomaterials, recycled agro-food residues etc. This also helps to advance innovation and awareness including on social level, looking on the role of design, arts and culture, as technological capacities. The improved understanding of the social attitudes in diverse European regions forms an important part of this action.

This action should support the implementation of sustainable bio-based value chains, in the regional settings, by developing guidelines and creating feedback loops to the respective policy makers. Proposals should benefit from social creativity and opportunities for bio-based systems unleashed at regional scale ensuring their low environmental footprint and sustainability. Robust environmental evaluation should underpin the effort undertaken.

The proposals should seek complementarities with related actions on governance of bio-based innovation and ensure inclusiveness and engagement of all actors, especially SMEs, civil society organisations including NGOs and broader civil society (e.g. educational institutions, museums, science, art centres).

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. Proposal

could explore intersectionality approaches and consider aspects like gender, ethnicity, migrant or refugee status, social class, sexual orientation and disability to ensure inclusion of marginalised groups in decision-making, citizen engagement and training activities.

Proposals should:

a. Analyse and develop guidelines on the regional bioeconomy-related skills/(re)-training/adult learning programmes to allow replication across Europe, taking into account the diversity of regional/local approaches, including the existing support measures (e.g. bioeconomy strategies, sectorial public and industry programmes and initiatives).

b. Assess and integrate the contribution from the humanities/art/design/culture into bioeconomy/bio-based economy sectors (e.g. role of innovation and sustainability for the new bio-based materials, new functionalities, safety, user-friendliness, understanding);

c. Ensure efficient exchange of best practice and engagement of all actors (e.g. regional and local authorities, SMEs, civil society organisations including NGOs, University alliances and professionals' associations, knowledge providers, artists, designers and architects) via robust and transparent communication and awareness-rising campaigns;

d. Analyse and develop recommendations on social and economic barriers and potentialities (e.g. job creation capacity and its quality) to enable the transition towards socially and environmentally responsible behaviour within all ranges (e.g. regulatory measures, corporate responsibility initiatives, education), ensuring inclusiveness of all actors (NGOs, civil society, including women, ethnic and religious minorities, migrants and refugees, the LGBTIQ community, disabled persons, youth and the elderly, etc);

e. Link with relevant activities under H2020, BBI JU, BIOEAST Initiative and EIT Knowledge and Innovation Communities, in particular their education efforts.

This topic should involve the effective contribution of SSH disciplines.

Topic ID and title	HORIZON-CL6-2021-GOVERNANCE-01-10: Raising awareness of circular and sustainable bioeconomy in support of Member States to develop bioeconomy strategies and/or action plans				
Budget	EUR 4 million	**Opening date**	22 June 2021	**Deadline 1**	06 October 2021
Budget per project	EUR 4 million			**Deadline 2**	/
Type of action	Coordination and Support Actions (CSA)				
FTP subsector	Bioeconomy				
Keywords	decision makers, public administrators, bioeconomy, circular bio-based sector, Strategy, Action Plan, national stakeholders, foresters, biomass resources				
FTP comments					
FTP SIRA 2030 Challenges addressed	1E			**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome

Successful proposal(s) will contribute to the expected impacts of Destination 'Innovative governance, environmental observations and digital solutions in support of the Green Deal' "Innovative governance models enabling sustainability and resilience notably to achieve better informed decision-making processes, social engagement and innovation". This action will support Member States that do not have a bioeconomy strategy and/or an action plan in developing one as part of their preparation for a sustainable economic, social and environmental transition to climate neutrality as called for in the European Green Deal.

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

- Increased awareness of decision makers and public administrators in different ministries about the various bioeconomy sectors, the role of the bioeconomy in the EU policies, the benefits of the bioeconomy and particularly the circular bio-based sector, including products substituting fossil-based and carbon-intensive products and reducing of respective emissions of GHGs and other pollutants.
- Improved inter-ministerial interaction and engagement in Member States that are developing or are preparing to develop their Strategy and/or Action Plan through exchange of good practices and experiences at meetings and conferences.
- Increased awareness of the bioeconomy and its potential among a broad range of national stakeholders, such as the general public, knowledge providers, universities, investors, industry, primary producers and NGOs, through tools such as for example workshops, living lab activities, exhibitions.

- Better interconnection of stakeholders into national bioeconomy hubs with the aim of providing a framework and the assurance that even without national level strategic orientation they are in line with the EU objectives.
- Improved information about current policy instruments and solutions to bridge between strategies and actual policy, including exploitation of opportunities offered by the current EU policy framework (e.g. related to circular economy, energy, innovation, agriculture).

Scope

The European Green Deal, the Commission's growth strategy, has set Europe on its path to be the first climate neutral continent by 2050 and achieve a green transition that must be just, fair and inclusive. One of the seven core pathways to deliver on climate neutrality, identified in the Clean Planet Strategy is the bioeconomy. The updated EU bioeconomy strategy has highlighted the relevance of developing national bioeconomy strategies and action plans to deploy a sustainable and circular bioeconomy across Europe taking into account economic, social and environmental aspects.

To date, there are still Member States, including many from Central and Eastern Europe that do not have a national bioeconomy strategy and/or action plan despite their high biomass resource base and new bioeconomy potential. This topic should support Member States to develop strategies and/or action plans by improving knowledge and raising awareness of a sustainable, circular bioeconomy, its challenges and opportunities as well as experiences made elsewhere.

Moreover, the topic should help to bring together national stakeholders in deploying and fostering the bioeconomy related research and innovation developments by engaging local stakeholders into the participation in macro-regional and European thematic networks and into building the common European Research Area.

The focus of the topic should be two-fold: reaching out to decision makers and public administrators in different ministries as well as to a wide range of stakeholders crucial for the development of the national strategies and bioeconomy deployment across Europe. These stakeholders could consist for example of investors, industries, SMEs, feedstock providers (e.g. waste, side streams, farmers, foresters, fishermen). It is also relevant to cooperate and establish links with relevant existing initiatives such as the BIOEAST, EUBIONET, BBI JU and the Circular Bio-based Europe (CBE) Partnership.

This topic should ensure that Member States without bioeconomy strategies and/or action plans become equally empowered to make the transition to climate neutrality as those that already have a bioeconomy strategy in place.

Mission: Adaptation to climate change

Call – Better prepared regional and local authorities to adapt to climate change

Topic ID and title	HORIZON-MISS-2021-CLIMA-01-01: Better prepared regional and local authorities to adapt to climate change				
Budget	EUR 5 million	**Opening date**	22 June 2021	**Deadline 1**	14 September 2021
Budget per project	EUR 5 million			**Deadline 2**	/
Type of action	Coordination and Support Actions (CSA)				
FTP subsector	F&F, WW, P&P				
Keywords					
FTP comments					
FTP SIRA 2030 Challenges addressed				**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

Project results are expected to contribute to some5 of the following expected outcomes:

- regional and local authorities gear up their preparations for meeting current and future objectives and requirements when it comes to climate adaptation and climate risk management, in the Climate Law6 - namely in the new EU strategy on adaptation to climate change7 - and in the Union Civil Protection Mechanism legislation8 ;
- regional and local authorities, citizens and other stakeholders improve their understanding of climate risk and have improved access to relevant climate science, data and information from public and private sources and services (e.g. from regional climate projections and predictions, Copernicus, GEOSS and European Research Infrastructures (ERI)9);
- regional and local authorities have access to a range of funding and financing opportunities to create an enabling environment for adaptation action;
- regional and local authorities embrace a transformative, inclusive and systemic approach, including societal transformation dimension, towards climate change adaptation action and just transition (in the wider sustainability context);

- citizens and stakeholders are aware of climate impacts and risks, and engaged in the co-creation and sharing of data, knowledge and solutions fundamental for the transformation to become climate resilient (including by building on citizen science, social dialogue and social innovation approaches);
- regional and local authorities adopt an integrated approach to solutions addressing climate change adaptation and climate resilience, namely no/low-regret adaptation solutions with co-benefits of adaptation actions for mitigation, zero pollution, biodiversity (e.g. nature-based solutions), resource efficiency, the economy, society, cultural heritage, human health and well-being;
- regional authorities and communities are equipped to assess adaptation gaps in a systematic and forward-looking manner.

Scope:

This action should provide services to support regional and local authorities in their preparation to meet the current requirements of the Union Civil Protection Mechanism legislation, and the foreseen adaptation objectives in the Climate Law, underpinning the new EU strategy on adaptation to climate change in terms of research and innovation, data and knowledge, and capacity and skills.

Furthermore, this action should take stock of past, ongoing and future activities related to climate change adaptation, including innovative approaches to climate adaptation plans to implement a mix of solutions – based on technological, non-technological, and social innovations – and to explore transformative pathways. This would give an indication of best practices and solutions already available, gaps and barriers to address climate change adaptation in a more holistic matter; as well as options for transformative and innovative approaches.

In particular, the action should help regional and local authorities to:

a. better understand their climate risks, solutions available to mitigate such risks and ways to achieve climate resilience, including by some of the following activities:

    1. facilitating access to services specific to climate risk assessments at regional and/or local level, focusing on particularly vulnerable regions;

2. assisting in the elaboration of climate risk management plans, including provisions for their monitoring and evaluation;

3. providing a tailor-made overview of potential technological, non-technological, and social solutions – in particular breakthroughs, disruptive and radically new innovations – (which includes their effectiveness, inclusiveness, costs and benefits) and establishing close synergies with the Horizon 2020 European Green Deal call, in particular the topic on Climate-resilient Innovation Packages for EU regions (LC-GD-1-3-2020), and the topic on developing end-user products and services for all stakeholders and citizens supporting climate adaptation and mitigation (LC-GD-9-2-2020), as well as drawing on the results from relevant projects from Horizon 2020 and the LIFE Programme;

4. identifying and mapping of priority research and innovation areas where gaps exist;

5. facilitating a process designed to co-develop a vision of what a transformation towards climate resilience might mean in their regional and/or local context taking a systems approach (key community systems and enabling conditions), and including an analysis of levers, barriers and tipping points for transformation;

6. jointly (consortium participants, regional/local authorities and relevant stakeholders) assess adaptation capacity, behavioural insights, changes in social practices, skills and conditions (e.g., framework, governance, finance) needed to undergo a transformation towards climate resilience, with the objective to develop a self-assessment tool available to those authorities that are not able to receive the services from the consortium.

b. establish approaches and processes that enable co-design , co-development, and co-implementation with citizens and stakeholders (including academia, industry, social partners, public authorities and regulatory agencies) in line with the recently adopted Climate Pact10, through some of the following activities:

    1. cross-fertilisation of cutting-edge science on climate change impacts and risks that is locally/regionally relevant and comprehensible;

    2. fostering co-production of data at local level and knowledge and co-design of climate services to support a transformation towards climate resilience;

3. supporting the implementation of citizen science, citizen observatories, social innovation and other means of joint knowledge gathering and monitoring to support a transformation towards climate resilience (e.g. the projects on air quality11);

4. assisting regional and local communities in the preparation of large-scale living labs12 for the development and testing of transformative inclusive solutions towards climate resilience (exploring synergies with living labs foreseen in relevant Horizon Europe partnerships);

5. facilitating the establishment of inclusive and deliberative governance processes supporting just transitions;

c. map and facilitate synergies by identifying funding and financing opportunities for the creation of important R&I-related enabling conditions in support of reaching climate resilience, including in the context of establishing close synergies with the preparatory action on Coordination of complementary actions for missions in this Work Programme, (topic HORIZON-MISS-2021-COOR-01):

    1. Data and operational climate services, including National Meteorological Services, Copernicus Climate Change Service, and Copernicus Emergency Management, Horizon 2020 and Europe relevant projects, as well as relevant action of GEOSS (Global Earth Observation System of Systems);

    2. the region-specific smart specialization strategies (ERDF/CF PO1) and regional operational programmes for Strategic Objective 2;

    3. the Digital Europe Programme, in particular the digital twin on climate change adaptation;

    4. the skills agenda and the European Social Fund (ESF+) to create the needed capacities and skills;

    5. Horizon Europe instruments, including those of bottom-up nature like the European Research Council or the Marie Skłodowska-Curie Actions, and its partnerships and missions;

    6. other relevant EU, national and or regional programmes and instruments (e.g. Just Transition Fund, Recovery and Resilience Facility, European Structural and

Investment Funds, Erasmus+ programme, European Solidarity Corps, Invest EU, and relevant financing by the European Investment Bank).

Actions should address all the three main objectives under the scope, tackling some of the specific outcomes (sub-bullets under the three main objectives). Therefore, the consortium13 should possess the expertise necessary to successfully deliver on the three main objectives. Regional and local authorities are not expected to be consortium participants, but to receive services from the consortium; in other words, they are the target groups of the project's activities.

The services covered by this topic should be accessible to as many regional and local authorities as possible. The consortium is expected to accompany the authorities and relevant stakeholders through the delivery of the services needed and to the achievement of clear outcomes. Priority should be given to regions or locations with the high vulnerability14, limited resources and/or low adaptive capacity15 to climate change impacts. Demand could be higher than what can be supplied within the limits of this action, therefore proposals should include criteria for how to identify the regional and local authorities most in need of these services. These criteria will ensure that a variety of locations are represented, in as many countries as possible, reflecting the diversity in climatic risks in Europe, as well as differences in socio-economic and demographic conditions, and in approaches to mitigating such risks. Such criteria should also take into account the characteristics of the populations concerned and the vulnerability of the locations in order to subsequently understand the effectiveness of the services provided by the consortium.

The project is expected to have a duration of three years. Early in the project the consortium should define a list of regional and local authorities that would benefit from the project's activities. By the end of the project, the consortium should propose a strategy to maintain the services offered through a platform, entity or partnership with relevant organisations.

Consortium participants should establish synergies with relevant projects funded under this Work Programme as well those originating from Horizon 2020, in particular the Green Deal Call (topics in area 1, as well as LC-GD-9-2-2020 and LC-GD-10-1-2020), should be explored and established during the course of the project. In particular, projects resulting from the calls mentioned above, as well as from Cluster 3 on Disaster Resilient Societies should be foreseen, Cluster 5 on Climate, Energy and Mobility, and Cluster 6 on Food, Bioeconomy, Natural Resources, Agriculture and Environment. In addition, the consortium should draw, when appropriate, upon the capabilities, expertise and data available at the Joint Research

Centre in the area of Smart Specialization and urban sustainable development strategies, and the European Environment Agency through the European Climate Adaptation Platform (Climate-ADAPT), the European Topic Centre on Adaptation and the EIONET network of Member States.

The possible participation of the JRC in the project will consist of connecting to the regions, local communities and cities, which in their smart specialisation / local-urban development strategies are interested in the priority themes relevant for the mission.

Mission: Climate neutral and smart cities

Call – Supporting the transition towards climate neutrality within cities

Topic ID and title	HORIZON-MISS-2021-CIT-01-01: Supporting national, regional and local authorities across Europe to prepare for the transition towards climate neutrality within cities				
Budget	EUR 2 million	**Opening date**	22 June 2021	**Deadline 1**	14 September 2021
Budget per project	EUR 2 million			**Deadline 2**	/
Type of action	Coordination and Support Actions (CSA)				
FTP subsector	F&F, WW				
Keywords					
FTP comments					
FTP SIRA 2030 Challenges addressed				**FTP relevance**	Indirect
				Starting TRL	/
				End TRL	/

Expected Outcome:

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

- National, regional and local authorities in EU Member States and countries associated to Horizon Europe are well prepared for the transition towards climate neutrality within cities by national capacity and knowledge building in close co-operation with the Preparatory action 'Coordination of complementary actions for missions'.
- Accelerated systemic transition to climate-neutrality for European cities by preparing local authorities to meet the overarching objectives of the European Green Deal49 and the specific targets established by the Sustainable and Smart Mobility Strategy50, the upcoming New EU Strategy on Adaptation to Climate Change 51, the Renovation Wave for Europe Strategy52, the European Climate Pact53 and the 2030 Climate Target plan54.
- Enhanced synergies and common action points with the Urban Agenda for the EU55 in the areas of better regulation, funding and knowledge through interactions with the Urban Agenda Thematic Partnerships 56 as well as the European Urban Initiative57.

- Identification of country-specific challenges and opportunities in terms of regulatory framework, funding and financing, urban morphology and governance structures promoting exchange of best-practices.
- Enhanced synergies with R&I national/international communities and partnerships (such as the proposed 'Driving Urban Transitions to a Sustainable Future' Horizon Europe Partnership), including the City Science Initiative network promoting evidence-based policy making.
- Define user requirements, while disseminate and promote the use of self-assessment toolkits and mappings adapted to national, regional and local challenges and opportunities.

Scope:

Cities are at the forefront of the transition towards greater sustainability. An increasing number of European cities are active pursuing the transition towards climate-neutrality, aligning with the objectives set by the European Green Deal Strategy. Furthermore, the Sustainable and Smart Mobility Strategy, calls for having at least 100 climate neutral cities in Europe by 2030. The Communication on the European Climate Pact calls for a large engagement of all relevant actors to build a greener Europe and support the achievement of the Agenda 2030 on Sustainable Development Goals58, bringing together regions, local communities, civil society, industry, social partners and schools.

While willing to commit to start the path towards climate neutrality, cities are also being confronted with national, regional and local specificities, which create both challenges and opportunities. Member States and Associated countries are characterized by inherent diversities and needs when addressing legislations and regulations, funding and financing needs and opportunities, as well as geographical, climatic and socio-cultural peculiarities. The uniqueness of the European cities requires tailored national support, translating the European objectives into the local ambitions while keeping citizens needs at the core.

Specific national networks for these cities will support translating and tailoring the goals of the European Green Deal Strategy and all relevant initiatives launched within this framework to the local specificities in close collaboration with national and local authorities, stakeholders and citizens.

The proposal should:

- In coordination with the 'Missions Core Network'59, support the set-up of dedicated national networks for supporting cities in their transition towards climate neutrality in the form of multi-stakeholders national platforms, promoting collaboration, cross-learning and training, exchange and replication of best practices between the European, national, regional and local level.
- Mobilize and support a large number of urban authorities in engaging in climate-neutrality transitions in line with the overarching objectives of the European Green Deal, the Sustainable and Smart Mobility Strategy, the upcoming New EU Strategy on Adaptation to Climate Change, the Renovation Wave for Europe Strategy, the European Climate Pact and 2030 Climate Target plan;
- Disseminate and promote the use of supporting material for cities developed by the Direct Action grant Scientific and technical services by the Joint Research Centre – Mission on 'Climate-neutral and smart cities', included under Other Actions in Annex 12 of the Horizon Europe Work Programme 2021-2022 and other relevant initiatives (e.g. relevant material developed by the one-stop-shop to be established under the Horizon 2020 topic LC-GD-1-2-2020 on 'Towards Climate-Neutral and Socially Innovative Cities'60).
- Identify country-specific challenges, best-practices and opportunities concerning at least:
    - Regulatory Framework: including interaction between national, regional and local legislations/regulations relevant for the transition to climate neutrality at city level.
    - Funding and financing: through direct/indirect application of National Energy and Climate Plans (NECPs)61, Cohesion Policy Funds and Recovery and Resilience Facility provisions.
    - Urban morphology: through the mapping of geographical, climatic and socio-cultural contexts.
    - Governance structures: through analyses of citizens' and stakeholders' roles in decision-making processes, existing living labs and hubs for innovative participative governance.

In order to support cities in evidence-based policy making for climate-neutrality, such investigation could benefit from the experience of the Joint Research Centre and relevant initiatives as the Community of Practice on Cities62 and the City Science Officers Initiative network 63. The results should aim at supporting local authorities' capacity building through dedicated activities such as: trainings, webinars and peer-exchange.

Applicants must take into account and assure that national hubs build on planned or ongoing national, regional or local activities aimed at achieving climate-neutrality in cities. The action should substantially raise the capacities and extend capabilities of existing national networks and hubs.