H20202018-2020 CALL SELECTION SC5 DRAFT WP

TOTAL CALLS	CODE	TOPIC/NAME	TYPE OF ACTION	TRL		BUDGET OF CALL	SUGGESTED PROJECT BUDGET	STAGE	OPENING DATE	DEADLINE
18				FROM	TO					
	LC-CLA-03	**Climate impacts in Europe**	RIA			20	5-7	Double	14 Nov 2017	27 Feb 2018 (First Stage) Sep 2018 (Second Stage)
	LC-CLA-05	**Human dynamics of climate change**	RIA			23	5-7	Double	14 Nov 2017	19 Feb 2019 (First Stage) Sep 2019 (Second Stage
	LC-CLA-06-	**Inter-relations between climate change, biodiversity and ecosystem services**	RIA			25	5-7	Double	14 Nov 2017	19 Feb 2019 (First Stage) Sep 2019 (Second Stage
	CE-SC5-04	**Building a water-smart economy and society**	IA		5-7	73	10-15	Double	14 Nov 2017	19 Feb 2019 (First Stage) 04 Sep 2019 (Second Stage)
	LC-CLA-02	**Negative emissions and land-use based mitigation assessment**	RIA			22	5-7	Double	14 Nov 2017	19 Feb 2019 (First Stage) Sep 2019 (Second Stage
	CE-SC5-07	**Raw materials innovation for the circular economy: sustainable processing, reuse, recycling and recovery schemes**	IA		6-7	20	8-13	Double	14 Nov 2017	19 Feb 2019 (First Stage) 04 Sep 2019 (Second Stage)

	SC5-11	**Digital solutions for water: linking the physical and digital world for water solutions**	IA		5-7	14	5	Double	14 Nov 2017	27 Feb 2018 (First Stage) 05 Sep 2018 (Second Stage)
	SC5-12	**EU-India water co-operation**	RIA	3	6	15	5	Double	14 Nov 2017	27 Feb 2018 (First Stage) 05 Sep 2018 (Second Stage)
	LC-CLA-04	Resilience and sustainable reconstruction of historic areas to cope with climate change and hazard events	R&I			18	5-6	Double	14 Nov 2017 (18;00)	27 Feb 2018 (First Stage) Sep 2018 (Second Stage)
	LC-CLA-07	The changing cryosphere: uncertainties, risks and opportunities	RIA			39	8-10	Double	14 Nov 2017	19 Feb 2019 (First Stage) Sep 2019 (Second Stage
	LC-CLA-08	Addressing knowledge gaps in climate science, in support of IPCC reports	R&I			60	6-8	Double	14 Nov 2017	27 Feb 2018 (First Stage) Sep 2018 (Second Stage)
	CE-SC5-01	Methods to remove hazardous substances and contaminants from secondary raw materials	RIA		5-7	34	3-5	Double	14 Nov 2017	27 Feb 2018 (First Stage) 5 Sep 2018 (Second Stage)
	CE-SC5-02	Independent testing programme on premature obsolescence	RIA			5	3-5	Double	14 Nov 2017	27 Feb 2018 (First Stage) 5 Sep 2018 (Second Stage)
	CE-SC5-03	Demonstrating systemic urban development for circular and regenerative cities	IA			39	10	Double	14 Nov 2017	27 Feb 2018 (First Stage) 5 Sep 2018 (Second Stage)

	CE-SC5-05	Coordinated approaches to funding and promotion of research and innovation for the circular economy	CSA			1	1	Single	14 Nov 2017	27 Feb 2018
	CE-SC5-06	New technologies for the enhanced recovery of by-products	RIA		3-5	15	3-7	Double	14 Nov 2017	27 Feb 2018 (First Stage) 5 Sep 2018 (Second Stage)
	SC5-18	Valuing nature: mainstreaming natural capital in policies and in business decision-making68	CSA			7.70	2	Single	14 Nov 2017	27 Feb 2018
	SC5-21	ERA-NET Cofund action(s) for climate action, environment, resource efficiency and raw materials	ERA-NET Cofund			10		Single	14 Nov 2017	19 Feb 2019

LC-CLA-03-2018: CLIMATE IMPACTS IN EUROPE

Scope: Actions should address only one of the following sub-topics:

a) Climate impacts on health in Europe: Actions should review, report and progress on the current state-of-the art knowledge on all links between climate change and impacts on human health in Europe that have thus far been poorly addressed or understood. Actions should also identify associated costs and suggest effective adaptation strategies, quantify health cobenefits from mitigation and early adaptation, target research actions to address key issues and identified research gaps15 and prioritise those that are of significance for Europe. Actions may, where appropriate, cluster with activities of global collaborative research actions (e.g. Belmont Forum) on climate change and health. Synergies with relevant actions under Societal Challenge 1 may also be considered.

b) Global climate impacts from a European perspective: Actions should analyse how climate impacts beyond European borders are likely to affect European policies on climate change, foreign affairs and security. Actions should also consider impacts on supply and value chains, and on associated sectors such as finance, business, infrastructure, resources and commodities. Actions should consider different climate (including high-end) scenarios and undertake a full risk analysis for Europe at the most appropriate geographic scales. In addition, actions may also consider other relevant European policies, and comment on how perceived associated risks may further impact on Europe.

LC-CLA-05-2019: HUMAN DYNAMICS OF CLIMATE CHANGE

Scope: Actions should address only one of the following sub-topics:

a) **Climate services for Africa:** Actions should exploit new, relevant climate data made available by Copernicus and other relevant sources (such as GEOSS) and create dedicated climate services for Africa for at least two of the following sectors: water, energy, land use, health and infrastructure. Actions should develop and deliver tools/applications which demonstrate clear end-user engagement, consultation and participation, and which enhance planning and implementation of climate adaptation strategies in Africa. Actions should consider activities addressed by other initiatives such as the Global Framework for Climate Services (GFCS), Copernicus, and development cooperation activities, and provide added value. Actions should further consider the EU-Africa Research and Innovation Partnership on Climate Change and Sustainable Energy.

b) **Climate and human migration**: Actions should identify and analyse drivers relating to climate change that may affect human migration and displacement patterns. Actions should – using a multidisciplinary approach- identify and describe climate parameters, develop analytical methodologies, and demonstrate how these relate to human migration patterns, including the probability of migration/forced displacement and design adaptation solutions

that may help in alleviating migration pressures at the source. They should also provide guidelines and policy recommendations for the European Agenda on Migration. Actions may also harness local knowledge and information by engaging with civil society organisations and citizen groups.

LC-CLA-06-2019: INTER-RELATIONS BETWEEN CLIMATE CHANGE, BIODIVERSITY AND ECOSYSTEM SERVICES

Scope: Actions should investigate at all relevant spatial and temporal scales the way that ecological processes, biodiversity and ecosystem services are impacted, both directly and indirectly, by climate change. Interactions and feedbacks between biodiversity, ecosystems functions and services and climate change, and the vulnerability of biodiversity and ecosystems functions and services to climate change and human activities should be investigated and modelled across a range of European climatic and ecological regions, accounting for social, ecological and economic aspects, multiple stressors and sources of uncertainty. These should include tipping points and safe operating spaces. The role of naturebased solutions in enhancing the efficiency and effectiveness of climate change adaptation and mitigation strategies should be assessed. Work should build, as appropriate, on existing knowledge and activities such as relevant FP7/Horizon 2020 projects and Copernicus Services, in particular on climate change, land monitoring and marine environmental monitoring, and contribute to long-term monitoring initiatives.

CE-SC5-04-2019: BUILDING A WATER-SMART ECONOMY AND SOCIETY

Scope: Actions should demonstrate the feasibility of a 'water smart' economy and society in which all available water resources, including surface, groundwater, waste water, and process water, are managed in such a way as to avoid water scarcity and pollution, increase resilience to climate change, appropriately manage water-related risks, and ensure that all valuable substances that could be obtained from waste water treatment processes, or are embedded in used water streams, are recovered.

Actions should address only one of the following sub-topics:

a) Symbiosis between industry and water utilities: Actions should demonstrate resourceefficient solutions derived from the systemic exploitation of symbiotic inter-linkages between wastewater treatment in industry and by water utilities. These might address, for instance, the reuse of treated wastewater, the use of substances or energy derived from wastewater treatment, or demonstrating the concept of dynamic allocation of the right quality of water for the right purpose, while ensuring health and safety. Innovative solutions do not need to be only technological, but may also encompass other types of innovation such

as innovative governance and stakeholder engagement or business models in industrial environments.

b) Large scale applications with multiple water users at various relevant scales: Actions should test and demonstrate systemic innovation in real life, large scale operational environments. Actions should address multiple water users (urban, industrial, rural and agricultural) and various relevant scales (regional/national/international) for:

- stimulating efficient and multiple use, recycling and reuse of water; recovery of energy
- and materials (such as nutrients, minerals, chemicals and metals) from water;
- managing water demand and efficient allocation;
- exploiting alternative water sources;
- prevention of water pollution and degradation of the aquatic environment; and
- cost-effective management of the water system and infrastructure.

As far as possible, the innovative solutions should include all of the above-mentioned activities. Actions should also consider: new marketing and financing concepts and strategies to maximise the multiple values of water and increase the attractiveness of the water sector for investors; new governance approaches and decision-making instruments for water managers; water systems vulnerability approaches and other sustainability assessments (e.g. footprint, Life Cycle Assessment).
The participation of social sciences and humanities, including gender, disciplines is considered crucial to properly address the complex challenges of this topic, especially those related to human behaviour and attitudes towards water, the inter-linkages between policy and implementation, and acceptance of the solutions developed by both the public and other water users.

LC-CLA-02-2019: NEGATIVE EMISSIONS AND LAND-USE BASED MITIGATION ASSESSMENT

Scope: The proposed action should address only one of the following sub-topics:

a) Feasibility of negative emissions for climate stabilisation: Actions should assess the potential, effectiveness, efficiency, risks and costs of existing and emerging negative emission technologies and practices for climate stabilisation and their impact on: land, subsurface, water, oceans and other resources, bio-diversity, human safety, ecosystems and their ability to deliver services to society, including implications for resilience, sustainability, feedbacks on climate and the global carbon cycle, and other relevant issues. Actions should also cover the issue of public acceptance and explore the international governance requirements associated with large-scale deployment of negative emission technologies and practices.

b) Land-based mitigation: Actions should provide a comprehensive analysis of various land-use based mitigation options at the global and regional level, assessing their potential and effectiveness in providing large-scale reductions of greenhouse gases, in the context of trade-offs and/or co-benefits in relation to other pressures and goals (e.g. food, energy and water security, biodiversity) and should analyse feedbacks between land-use based mitigation and climate change impacts. Actions should also improve current methodologies to estimate emissions and removals associated with land use measures, also by leveraging observations from GEOSS and in particular the Copernicus programme.

CE-SC5-07-2018-2019-2020: RAW MATERIALS INNOVATION FOR THE CIRCULAR ECONOMY: SUSTAINABLE PROCESSING, REUSE, RECYCLING AND RECOVERY SCHEMES

Scope: Actions should develop and demonstrate innovative pilots for the clean and sustainable production of non-energy, non-agricultural raw materials in the EU from primary and/or secondary sources finishing at Technology Readiness Levels (TRL) 6-7.

All actions should contribute to achieving the targets of the EIP on Raw Materials, particularly in terms of innovative pilot actions on processing and/or recycling for the innovative production of raw materials, and to building the EU knowledge base of primary and secondary raw materials by feeding into the EC Raw Materials Information System – RMIS. Actions should also contribute to improving the awareness of relevant external stakeholders and the general public across the EU about the importance of raw materials for society, the challenges related to their supply within the EU and about proposed solutions which could help to improve society's acceptance of and trust in sustainable raw materials production in the EU.

All actions should facilitate the market uptake of solutions developed through industriallyand user-driven multidisciplinary consortia covering the relevant value chain and should consider standardisation aspects when relevant.

All actions should justify the relevance of selected pilot demonstrations in different locations within the EU (and also outside if there is a clear added value for the EU economy, industry and society).

All actions should include an outline of the initial exploitation and business plans (with indicated CAPEX, OPEX, IRR and NPV) with clarified management of intellectual property rights, and commitment to the first exploitation.

Actions should also include a task to cluster with other projects financed under this topic and – where possible – with other relevant projects in the field funded by Horizon 2020, in support of the EIP on Raw Materials.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged.

Applying a circular economy approach throughout the entire value chain, actions for this multi-annual topic should address only one of the following sub-topics:

a) Sustainable processing and refining of primary and/or secondary raw materials: Actions should demonstrate new or improved systems integrating relevant processing and refining technologies for better recovery of minerals and metals at increased efficiency in terms of better yield and process selectivity as well as better utilisation of resources (hence reducing wastes). This would include recovery from low grade and/or complex ores and/or from industrial or mining wastes, and/or the reduction of the content of toxic elements or compounds in the resulting materials. The importance of the targeted raw materials and their sources for the EU should be demonstrated in the proposal. The solution proposed should be flexible enough to adapt to different or variable ore/secondary raw material grades and should be supported by efficient and robust process control. Where relevant, any solution proposed for the reduction of the content of toxic elements or compounds in the resulting materials should also include the appropriate management of the hazardous substances removed. Recycling of end-of-life products is excluded from this option.

b) Recycling of raw materials from end-of-life products: Actions should develop and demonstrate novel solutions for a higher recycling and recovery of secondary raw materials from end-of-life products such as waste electrical and electronic equipment (WEEE), batteries, wood-based panels, multi-material paper packaging, end-of-life tyres, etc. These products can contain a multitude of minerals, metals, wood and wood-fibre, rubber, etc. (including Critical Raw Materials and other technology metals).

c) Recycling of raw materials from buildings: Actions should develop and demonstrate novel solutions for a high-value recovery of raw materials from buildings. Actions should also develop a series of comparative case studies of construction and demolition waste (C&DW) management in deconstruction of buildings of representative size categories in countries with different types of end-of-life building stocks, showcasing the appropriate use of the following: the EU C&DW Management Protocol[42], pre-demolition audit, smart demolition practices, using appropriate technical equipment, and sorting/processing and quality management of waste fractions such as metals, aggregates, concrete, bricks, plasterboard, glass, polymers and plastics and wood.

d) Advanced sorting systems for high-performance recycling of complex end-of-life products: Actions should develop and demonstrate innovative dismantling and sorting systems enabling functional recycling of Critical Raw Materials, or other types of highly

efficient recovery of metals, minerals or construction materials, from complex end-of-life products and scrap thereof. The advanced sorting systems should achieve very high throughput rates in order to allow their economically viable operation on the European market.

SC5-11-2018: DIGITAL SOLUTIONS FOR WATER: LINKING THE PHYSICAL AND DIGITAL WORLD FOR WATER SOLUTIONS

Scope: Actions should develop and test new, robust and cybersecure systems, linking the physical and digital world to ensure tailored, water-smart solutions, to exploit the value of data for the water sector and to foster higher information transparency and accountability. They should cover various water management areas, cycles and value chains, based on an integrated approach of all water resources and water bodies. Actions should combine different types of advanced data and digital technologies in a multidisciplinary environment, including mobile technology, clouds, artificial intelligence, sensors, open source software and analytics. Aspects such as optimisation, prediction, diagnosis, microsystems, micro-/nano-sensors, modelling and visualisation tools, data management plans, assessment and real time monitoring for water quality and quantity, integrated water management, open data policies, enabling institutional frameworks, health issues, vulnerability to changing water conditions and disaster warnings and risk management should also be considered.

Actions should seek to bring together research and innovation players from the digital and physical spheres to address jointly challenges and opportunities, including regulatory and legislative barriers, data protection issues and opportunities for investments in different application sectors.To assure applicability and wide deployment of the innovative water technologies in different conditions (including different water resources, economic, social and regulatory settings) involvement of market take-up partners and/or end users from a wide range of different European regions is strongly encouraged.

LC-CLA-04-2018: RESILIENCE AND SUSTAINABLE RECONSTRUCTION OF HISTORIC AREAS TO COPE WITH CLIMATE CHANGE AND HAZARD EVENTS

Scope: Actions should establish how to implement the principle of building back better and safer in carrying out sustainable reconstruction and recovery interventions of historic areas where damage has occurred, thus rendering them more socially, economically and environmentally resilient, and/or should establish how to proactively enhance the resilience of these areas so that they will better cope with future disasters. Furthermore, actions should:

- develop, deploy and validate tools, information models, strategies and plans for enhancing the resilience of historic areas to cope with disaster events, vulnerability assessment and integrated reconstruction;

- test and pilot novel cost-effective solutions to enhance the resilience of buildings and whole historic areas to natural and climate change related hazards, while at the same time fully respecting the historic value of the places;

- provide science- and evidence-based guidelines and models to local authorities for carrying out sustainable reconstruction within a participatory and community–based context, while adopting new governance and finance models;

- improve and further develop models to predict direct and indirect impacts of climate, global and environmental change and related risks on historic areas;

- review, map and systematically characterize existing experiences and good practices in Europe and globally, through evidence and common metrics to evaluate and establish their replicability conditions, and recommend how historic areas can be rendered more resilient and better prepared to face future disaster events.

SC5-12-2018: EU-INDIA WATER CO-OPERATION

Scope: This action should develop new and/or adapt the most suitable existing innovative solutions for Indian conditions, both in urban and rural areas, to address wastewater treatment integrated with the reuse of reclaimed water and energy recovery from various sources and/or drinking water purification. Real time monitoring and management of water quality, using sensors and control systems, become an integral part of the resource management. Actions should therefore take into account India's water challenges both with regard to quantity and quality. In doing so, allocation of water should be facilitated and the supply should become more competitive or lead to an optimisation of costs; it should also lead to better water management and quality by finding solutions to the treatment of widely varying pollution loads including those from emerging pollutants. The impact of extreme climate and hydrological conditions (monsoon floods) should also be taken into consideration.

Actions addressing wastewater treatment should focus on sustainable use/reuse of water in rapidly expanding urban areas, as well as smaller cities lacking any type of suitable wastewater treatment. Actions may also address the development of appropriate decentralized water treatment and wastewater treatment and recycling systems, including the improvement of sewage collection and urban drainage systems. Water and energy efficient and costeffective processes, optimising use and maximising energy and materials recovery from wastewater treatment, reliable monitoring schemes to ensure safe water use

and reuse, and simple and affordable operation and maintenance methods should also be considered.

Actions focusing on drinking water purification should address multiple contaminants or focus on the identification and removal of specific classes of pollutants (e.g. pesticides, geogenic contaminants, etc.).

In actions on wastewater treatment and drinking water purification, the design, development and deployment of sensors and decision support systems for real time monitoring and control of water quantity and quality, should be considered.

In all cases, the involvement of relevant stakeholders, including industry partners, local authorities, water users, research centres and communities, is essential, together with a strong demonstration component involving transfer of European knowledge and expertise to facilitate future in house replication. Moreover, in addressing water allocation, the governance of water management and the efficiency of water use, especially for irrigation which is the largest water user, should be considered. Actions may also choose to address a combination of the above challenges at river basin scale. Activities are expected to focus on Technology Readiness Levels (TRL) 3 to 6.

In line with the strategy for EU international cooperation in research and innovation (COM(2012) 497), international cooperation is encouraged, in particular with the EU's strategic partners – which India is, as confirmed at the EU-India Summit on 30 March 2016. Actions should include Indian partners in a balanced way. This call should also contribute to the objective stated in the Memorandum of Understanding on water cooperation between India and the EU adopted on 7 October 2016[59] aiming at strengthening the technological, scientific and management capabilities of India and the EU in the field of water.
Proposals should pay attention to the special call conditions for this topic. Both the Indian Department of Science and Technology (DST) and the Department of Biotechnology (DBT) within Indian Ministry of Science and Technology, are committed to co-fund this call. This ensures a synergic approach and publication of a single joint announcement by both DST and DBT. The call text will also refer to the Co-Funding Mechanism (CFM) agreed between the EC and respectively DST and DBT. Proposals are to be developed jointly with the Indian entities. For funding purposes, the Indian entities need to submit the proposal to DST as well as to DBT if relevant. Evaluation will be done jointly according to the conditions specified in the CFM and in full respect of the EC peer review rules.

LC-CLA-07-2019: THE CHANGING CRYOSPHERE: UNCERTAINTIES, RISKS AND OPPORTUNITIES

Scope: Actions should aim at developing innovative approaches to address only one of the following sub-topics:

a) Sea level changes (Research and Innovation action): Actions should assess the processes controlling changes to global ice mass balance - including ice dynamics - such as ice shelfocean interactions, surface components, effects of crustal de-loading (Glacial Isostatic Adjustments) on relative sea level changes and/or gravitational effects of ice mass changes on the spatial patterns of sea-level changes. Actions should assess the status of ice sheets and glaciers, report on how their changes are likely to affect future sea-levels, and increase confidence in predicting changes in the cryosphere including through better representation of poorly represented processes. Actions should also analyse low probability high impact scenarios including those associated with the collapse of ice sheets (sea-level fingerprints). Actions may be focused on specific issues which substantially contribute to sea-level changes and to the assessment of the associated major risks to coastal communities, coastal ecosystems and critical infrastructure across the globe.

LC-CLA-08-2018: Addressing knowledge gaps in climate science, in support of IPCC Reports

Scope: Actions should address only one of the following sub-topics:

a) Improving the understanding of key climate processes for reducing uncertainty in climate projections: Actions should achieve better understanding of key processes, and associated feedbacks, affecting the climate-Earth system over time, in order to improve climate projections and constrain climate sensitivity estimates. Actions may cover processes such as cloud and aerosol dynamics and cloud-aerosol interactions, biochemical cycles and their evolution under a changing climate, ocean dynamics and circulation, dynamic interactions between atmosphere, land, ocean and ice (both sea ice and land ice), tropospherestratosphere coupling, external forcing and other relevant processes.

CE-SC5-01-2018: METHODS TO REMOVE HAZARDOUS SUBSTANCES AND CONTAMINANTS FROM SECONDARY RAW MATERIALS

Scope: Actions should develop innovative solutions for removing undesirable substances from secondary raw materials. The substances in question could be those posing health or environmental risks and/or those whose presence could adversely affect the quality of the secondary raw material. The safe utilisation or disposal of substances thus removed should be addressed as well. Proposals are expected to provide evidence of the potential market

impact that the proposed solutions could bring, including quantitative information on the size of the targeted market. The economic feasibility of the proposed solution should also be considered. The work should also produce recommendations on the design of materials for recyclability and for standardisation. Actions should be tackled by a multidisciplinary consortium, with significant participation of industry partners and recyclers. Participation of SMEs is desirable.

CE-SC5-02-2018: INDEPENDENT TESTING PROGRAMME ON PREMATURE OBSOLESCENCE

Scope: The objective is to prepare an independent testing programme to help identify issues related to premature obsolescence. The programme could be used by relevant stakeholders, such as, for instance, testing bodies, consumer organisations or product designers. It should focus on a group of consumer products for which the issue of obsolescence, including aspects such as the possibility of repair, upgrade and reuse, is important from the resource efficiency point of view. The methodology used to select this group of products should be convincingly explained. Where the issue of product durability encompasses interoperability and software support aspects, these should be addressed as well; however, the lifetime of software should not be the sole focus of the actions. A research component should be included to identify key aspects to be tested and to validate the testing programme in several case studies. An arrangement should be made that would enable inputs (e.g. examples of premature obsolescence or of testing methods) from a variety of stakeholders throughout the course of the project. Possible implications for standardisation should be addressed. The actions should be tackled by a multi-disciplinary consortium, including representatives of relevant stakeholders such as researchers, consumer organisations, testing bodies, manufacturers and repair service providers. Participation of representatives from the retail sector is encouraged.

CE-SC5-03-2018: DEMONSTRATING SYSTEMIC URBAN DEVELOPMENT FOR CIRCULAR AND REGENERATIVE CITIES

Scope: Actions should demonstrate how cities[30] can be transformed into centres of circular innovation and stimulate regenerative practices in both urban and peri-urban areas (including the surrounding industrial areas and commercial ports).

Actions should develop and implement innovative urban planning approaches and instruments (e.g. dynamic 3D real time flexible geospatial data and planning tools, innovative governance and legislation enabling new practices, design approaches, business models, etc.) to support and guide the transition towards circular and regenerative cities in terms of their built environment, public space, urban spatial use and programming. They should demonstrate innovative solutions for closing the loop of urban material and resource flows within the nexus of water, energy, food, air, ecosystem services, soil, biomass, waste/wastewater, recyclables and materials and for supporting an increase in the

regenerative capacity of the city. At the same time, these solutions should ensure sound management of trade-offs and synergies among and across sectors. They should include ways of sustainably reusing and (mixed-use) reprogramming of existing buildings, open spaces and (infra)structures. The action should actively involve public authorities, societal stakeholders and community-based partners such as city-makers, urban (fab-) labs, urban planners, (urban) designers, cultural & creative organisations, and start-ups in close collaboration with the cities to find practical and durable solutions.

In addition actions should develop and implement innovative local governance structures and networks to enhance circular economy innovation in the urban fabric and help prioritise flexible implementation of urban space programming for circular initiatives. Actions should enable the continuous monitoring and optimisation of "urban metabolic" processes and rapid management interventions, where needed, deploying new indicators enabling easy assessment, comparison and sharing of best practice on the ground as well as digital solutions comprising networks of sensors, big data, geo-localisation, observational programmes such as Copernicus and GEOSS, satellite navigation and positioning services offered by EGNOS/Galileo, and citizens' observatories.

Actions are expected to establish long-term sustainable data platforms securing open, consistent data on the impacts of the deployed approaches, and to ensure interoperability of relevant data infrastructures for effective communication, public consultation, and exchange of experiences.

An interdisciplinary approach, including the participation of applied natural sciences, social sciences and humanities disciplines (such as behavioural economics, gender studies, urban planning and governance) is considered crucial to properly address the complex challenges of this topic.

Proposals should pay attention to the special call conditions for this topic.

To enhance the impact and promote upscaling and replication of these solutions, actions should engage in substantial networking and training activities to disseminate their experience, knowledge and deployment practices to cities that are planning to design and implement similar solutions in a successive phase beyond the duration of the project. To enhance impact, cooperation and synergies with the activities undertaken within the Global Covenant of Mayors' initiative for Climate and Energy[31](supported by the EC) should be sought where appropriate.

Furthermore, actions should envisage resources for clustering with other ongoing and future projects on sustainable cities through nature-based solutions funded under the 'Smart and Sustainable Cities' call in part 17 of the 2016-2017 Work Programme as well as under the

topics SC5-20-2019 and SC5-14-2019 of this Work Programme.

CE-SC5-05-2018: COORDINATED APPROACHES TO FUNDING AND PROMOTION OF RESEARCH AND INNOVATION FOR THE CIRCULAR ECONOMY

Scope: The action should establish a joint platform which will formulate, based on a thorough understanding of the state-of-the-art, the research and innovation needs and priorities for circular economy development in the EU. To this end, this action should bring together national and regional programme owners which will adequately represent the diversity of conditions and approaches from around the EU. The action should encompass joint development of objectives, priority setting, impact assessment, and programme and project organisation. It should produce a Strategic Research and Innovation Agenda, summarizing recommendations for research priorities and coordinated programming and funding mechanisms. Innovation involving SMEs should be explicitly addressed. The action should disseminate best practices and promote multinational research and innovation actions within national and regional programmes. It should also include a mechanism whereby it could draw from the expertise and experience of leading research organisations as well as industry and civil society organisations. It should seek cooperation and synergies with relevant initiatives addressing the circular economy, including those funded by the EU.

CE-SC5-06-2018: NEW TECHNOLOGIES FOR THE ENHANCED RECOVERY OF BY-PRODUCTS

Scope: Actions should develop sustainable systemic solutions through industrially- and userdriven multidisciplinary consortia covering the relevant value chain of non-energy, nonagricultural raw materials.

Actions should evaluate the potential by-products[36] existing in primary or secondary raw materials and should develop energy-, material- and cost-efficient new sustainable mineral processing and/or metallurgical technologies and processes to increase the selectivity and the recovery rates of valuable by-products, particularly Critical Raw Materials. The importance of the targeted sources of by-products for the EU economy should be duly demonstrated in the proposal. Recycling of end-of-life products is excluded from this topic.

All actions should contribute to achieving the objectives of the EIP on Raw Materials and to building the EU knowledge base of primary and secondary raw materials by feeding into the EC Raw Materials Information System – RMIS . Actions should also contribute to improving the awareness of relevant external stakeholders and the general public across the EU about the importance of raw materials for society, the challenges related to their supply within the

EU and about proposed solutions which could help to improve society's acceptance of and trust in sustainable raw materials production in the EU.

Actions should include a task to cluster with other projects financed under this topic and – if possible – with other relevant projects in the field funded by Horizon 2020, in support of the EIP on Raw Materials. In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged.

SC5-18-2018: VALUING NATURE: MAINSTREAMING NATURAL CAPITAL IN POLICIES AND IN BUSINESS DECISION-MAKING

Scope: Actions should address only one of the following sub-topics:

a) Valuing nature: developing and implementing natural capital and ecosystem accounts in EU Member States and Associated Countries: Actions should develop and implement natural capital and ecosystem accounts in Member States/Associated Countries, according to the SEEA-EEA recommendations [72] and the methodological work and guidance of KIPINCA. They should further refine and implement in practice European/international guidance standards in European countries, leading to their replicability.

Actions should exploit available large scale data and link them to the EU layer for more detailed analysis, and experiment with different solutions for biophysical accounts and their valuation and monetisation. The natural capital and ecosystem services accounts developed should be published for use by different stakeholders and for different policy and business applications. Actions should promote the inclusion of natural capital and ecosystems services accounting in national statistics.

Actions should involve organisations both from Member States/Associated Countries that are more advanced with natural capital and ecosystem services accounts and from those that are only just starting to deal with such accounts. More experienced participants should primarily share their experience with, provide advice to and mentor less experienced participants, to enable them to rapidly implement and mainstream the methodologies. In addition, more experienced participants may choose to also develop further their own natural capital and ecosystem accounts (for instance, testing new valuation approaches and methods).

Participation and strong commitment from public authorities in charge of natural capital and ecosystem services accounts (for example, Ministries or Environment Agencies), as well as National Statistical Offices or other statistical authorities[74], is strongly encouraged for the success of this action.
Actions should exploit the experience of KIP-INCA partners and the ongoing work of MAES.

b) Operationalisation of natural capital accounting in business decisions: Actions should facilitate the implementation of the Natural Capital Protocol at corporate level. They should therefore take stock of the work undertaken by ongoing initiatives, such as European and national platforms on business and biodiversity and the Natural Capital Protocol and should establish a "Valuing Nature Programme and Network". The network should bring together work being undertaken by business in relation to natural capital and come up with optimal scientifically rigorous solutions for operationalising and mainstreaming natural capital, including nature-based solutions, green infrastructures and biodiversity, in companies' decision making frameworks and business models. It should aim to build a community of practice through an EU network of networks of businesses, administrations and academia, engaging key stakeholders from business, government, the knowledge and research community and civil society in open source collaboration. Together they should to shape the business perception of the value of nature as a business opportunity and as a means of reducing economic risks and fostering sustainable businesses. This will also incentivize business investments in nature-based solutions. There is a need to stimulate early adoption, since potential first-movers may be risk-averse. This can be mitigated through life-long learning, training and guidance, and by demonstrating the benefits at corporate level.

SC5-21-2019-2020: ERA-NET COFUND ACTION(S) FOR CLIMATE ACTION, ENVIRONMENT, RESOURCE EFFICIENCY AND RAW MATERIALS

Scope: The final scope of this topic will be confirmed in an update to the Work Programme. Areas under consideration include: emerging pollutants; international cooperation on disaster risk reduction and multi-hazard risk management, with emphasis on environmental change; health, environment and climate change; conservation and protection of cultural heritage.

Proposals should pool the necessary financial resources from the participating national (or regional) research programmes with a view to implementing a joint call for proposals resulting in grants to third parties with EU co-funding in this area. Proposers are requested to include additional joint calls without EU co-funding as well as other activities such as the establishment or consolidation of a pan-European network of funding agencies and other key players in Europe, building on previous experience and avoiding overlaps with other

initiatives, support to mutual learning and training, exchange of good practice, researcher mobility and equal opportunities (e.g. through EURAXESS) and better careers in the field. Wherever relevant, actions should involve social sciences and humanities.

Synergies should be ensured with relevant public-public partnerships such as the JPI Water, JPI Climate, JPI Cultural Heritage and/or the BiodivERsA ERA-NET, as well as with international programmes such as the Belmont Forum, as appropriate. Participation of legal entities from international partner countries and/or regions is encouraged in the joint call as well as in other joint activities including additional joint calls without EU co-funding. Participants from this/these country/ies may request a Union contribution (on the basis of the ERA-NET unit cost) for the coordination costs of additional activities.