



EN

Horizon 2020

Work Programme 2018-2020

12. Climate action, environment, resource efficiency and raw materials

Important notice on the Horizon 2020 Work Programme

This Work Programme covers 2018, 2019 and 2020. The parts that relate to 2019 and 2020 are provided at this stage on an indicative basis. Such Work Programme parts will be decided during 2018 and/or 2019.

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Introduction

The Societal Challenge 5 Work Programme for 2018-2020 focuses on moving to a greener, more resource efficient and climate-resilient economy in sync with the natural environment, demonstrating a strong commitment to supporting the UN's Sustainable Development Goals (SDGs) and the targets of the COP21 Paris Agreement. This Work Programme is therefore structured around two calls: 'Building a low-carbon, climate resilient future: climate action in support of the Paris Agreement' and 'Greening the economy in line with the SDGs'. Overall, the Work Programme contributes strongly to the focus areas 'Building a low-carbon, climate resilient future' and 'Connecting economic and environmental gains - the circular economy'.

Sustainable development is at the heart of Societal Challenge 5, and this Work Programme contributes to many of the 17 Sustainable Development Goals, including sustained, inclusive and sustainable economic growth; climate action; responsible consumption and production; industry, innovation and infrastructure; sustainable cities and communities; clean water and sanitation; and sustainable use of terrestrial ecosystems.

Guided by the political drivers of increased investment in sustainable development and climate related research and innovation (R&I), integrating digitisation, strengthening international R&I cooperation, societal resilience and market-creating innovation, this Work Programme focuses on six priorities:

- Climate action in support of the Paris Agreement
- Circular economy
- Raw materials
- Water for our environment, economy and society
- Innovating cities for sustainability and resilience
- Protecting and leveraging the value of our natural and cultural assets (which includes Earth observation, nature-based solutions, disaster risk reduction and natural capital accounting, and heritage alive).

Tackling these priorities requires a systemic approach to innovation, i.e. innovation that aims for a system-wide transformation by affecting the system's economic, social and environmental dimensions as well as their interconnections. This implies a challenge-driven, solutions-oriented, trans-disciplinary perspective that integrates technology, business models and economic organisation, finance, governance and regulation as well as skills and social innovation, and involves co-creation of knowledge and co-delivery of outcomes with economic, industrial and research actors, public authorities and/or civil society.

Within this Work Programme, actions support R&I which aims to both improve our understanding of the causes of climate change and to pave the way for pathways and solutions

to address them, underpinning European and global efforts to achieve the targets of the Paris Agreement. Beyond the general focus on Europe (including its outermost regions), specific attention will be paid to climate change hot-spots as well as to cooperation with key international partners.

At the same time, actions in this Work Programme aim to help build societies that are resilient to the impacts of climate change, extreme events and natural disasters. Cities are the home of complex, inter-dependent challenges related to resource depletion, climate change impacts, environmental degradation, pollution, health issues and social exclusion. Actions therefore aim to develop, deploy and validate approaches – based on nature-based solutions – that can simultaneously address these challenges. Under the current EU research and innovation policy framework nature-based solutions are defined as: “Living solutions inspired and supported by nature that simultaneously provide environmental, social and economic benefits and help to build resilience. These solutions bring more nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions.” Ultimately actions will support both the global Urban Agenda adopted in Quito and the Sendai framework for Disaster Risk Reduction.

Living within the limits of the planet means ultimately decoupling economic growth from resource use, which demands a fundamental shift in technology, economics, finance and society as a whole. The transition to a more circular economic model can strongly contribute, with products, processes and business models that are designed to maximise the value and utility of resources while at the same time reducing adverse health and environmental impacts. This will also contribute to climate action, since improving the efficiency and effectiveness of resource use (both primary and secondary) will help boost energy efficiency while also leading to a reduction in greenhouse gas emissions. The circular economy is also of utmost importance for a sustainable regional development (including remote territories such as islands and outermost regions). Actions in this Work Programme are expected to improve the efficiency and effectiveness of resource use (including water), substantially reduce the generation of residual waste and thus reduce adverse environmental/climate effects, while also providing new business opportunities, including for SMEs.

Raw materials are crucial for a strong European industrial base, an essential building block of the EU's growth and competitiveness. Future global resource use could double between 2010 and 2030¹. R&I for sustainable access to and use of primary and secondary raw materials will continue to play a fundamental role in maintaining the competitiveness of industry, facilitating the transition to a circular economy and developing low carbon technologies. However, the EU is confronted with a number of challenges along the entire raw materials value chain to secure a sustainable access to non-energy non-agricultural raw materials used for industrial purposes, including an increasing number of Critical Raw Materials (CRM).

¹ Decoupling natural resource use and environmental impacts from economic growth. A Report of the Working Group on Decoupling to the International Resource Panel. UNEP.

The actions on raw materials are expected to contribute to the implementation of the Raw Materials policy², the Strategic Implementation Plan³ of the European Innovation Partnership (EIP) on Raw Materials, the Circular Economy package and the Blue Growth Strategy. The actions complement and are in synergy with those of the Knowledge and Innovation Community on Raw materials⁴, selected under the Horizon 2020 call of the European Institute of Technology (EIT) in support of the objectives of the EIP on Raw Materials.

Actions in this Work Programme with a focus on water will support and accelerate the implementation of EU water, resource efficiency and water-dependent industrial policies and initiatives, including the European Innovation Partnership Water (EIP Water). They will also contribute to the EU's policies on the Energy Union, climate action and the digital economy, while strengthening international collaboration and partnerships on water-smart solutions, technologies and governance, and thereby also supporting Europe in achieving relevant commitments under the UN's 2030 Strategy for Sustainable Development. During the period 2018-2020, Societal Challenge 5 also supports the PRIMA initiative (Partnership for Research and Innovation in the Mediterranean Area).

Finally, actions in this Work Programme aim to both protect and develop natural and cultural assets, such as biodiversity, ecosystems and tangible cultural heritage, and to leverage their value for the economy and society. Actions will also aim to harness the wealth of existing Earth observation data and information to support the objectives of the Sustainable Development Goals, whether in the areas of climate action, water management, environmental protection, business competitiveness, or others.

This Work Programme implements several overall recommendations expressed in the Horizon 2020 interim evaluation. Moreover, the Societal Challenge 5 thematic assessment of the interim evaluation identified further specific areas for improvement:

- the involvement of pertinent stakeholders in the Horizon 2020 Societal Challenge 5 fields, such as NGOs and Civil Society Organisations (CSOs), remains low;
- oversubscription and low success rates;
- the participation of Third countries has decreased when compared with the Environment theme in the 7th Framework Programme. The topics with most participation from third countries are those with a strong international dimension;
- and stakeholders noted the programme is too complex and recommended in particular a more strategic use of ERA-NET Cofund actions for Societal Challenge 5.

The Commission is implementing specific measures to tackle overall and thematic specific issues in this last Work Programme for 2018-2020:

² Communication on the Raw Materials Initiative "Meeting our critical needs for growth and jobs in Europe" - COM(2008) 699 final, and Communication on commodity markets and raw materials - COM(2011) 25 final

³ <https://ec.europa.eu/eip/raw-materials/en/content/strategic-implementation-plan-sip-0>

⁴ <http://eit.europa.eu/eit-community/eit-raw-materials>

- a reduced number of topics with higher budgets and extended use of two-stage proposals to mitigate oversubscription and to simplify and shorten the Work Programme. More bottom-up topics, together with reinforced systemic and multidisciplinary approaches, should ensure a wider range of stakeholder and end-user involvement;
- reinforcement of international cooperation across both calls and topics with a strong international dimension, especially to ensure the follow-up and implementation of the COP21 Paris Agreement; and
- a reduced number of ERA-NET Cofund actions, on issues which have been developed via a more strategic approach with Member States, Associated Countries and relevant JPIs.

Within the overall framework of contributing to smart, sustainable and inclusive growth, the priorities of this Work Programme help implement other high-level EU policies including the 7th Environmental Action Programme to 2020, and policies on the Circular Economy, the Energy Union (including the Communication 'Accelerating Clean Energy Innovation') and the Arctic. All of these put special emphasis on science and innovation as critical drivers for achieving long-term goals and targets. Ultimately, activities will contribute to the Commission's priorities of 'Jobs, Growth and Investment', 'Energy Union and Climate', 'Digital Single Market' and 'Stronger Global Actor', through a process underpinned by open science and open innovation, and which is open to the world. These priorities are also in coherence and synergy with actions at national, regional or local levels, via the ESIF and links to EU Presidencies, and with other initiatives such as Joint Programming Initiatives (JPIs)⁵ and the European Institute for Innovation and Technology's (EIT) Knowledge and Innovation Communities (KICs).

In line with the strategic coordination needed to implement the cross-cutting nature of Blue Growth and the Activities 2.3 and 2.5 of the Horizon 2020 Specific Programme, some actions in this Work Programme will specifically contribute to marine and maritime research and innovation, the blue economy, and ocean governance.

Furthermore, the activities in this Work Programme should be in line with Responsible Research and Innovation, a cross-cutting issue that engages society, promotes gender equality including by integrating the gender dimension of research and innovation content, promotes high ethical standards, ensures access to research outcomes, and encourages formal and informal science education. This will help ensure that the outcomes of the work align with the values, needs and expectations of society.

For the Innovation Actions in this Work Programme, additional or follow-up funding – whether private or public – should be sought within the projects funded, including from relevant regional/national schemes under the European Structural and Investment Funds (ESIF), in particular under the European Regional Development Fund (ERDF), or other

⁵ in particular the JPIs 'Connecting Climate Knowledge for Europe', 'Water challenges for a changing world', 'Cultural Heritage and Global Change' and 'Urban Europe'

relevant funds such as the Instrument for Pre-accession Assistance (IPA II). To achieve this, projects could seek contact with ERDF/IPA managing authorities and with the authorities who developed the Research and Innovation Smart Specialisation Strategies (RIS3). The responsible regional/national authorities could then take an interest in the projects and their expected results. They could engage in the use and deployment of the novel solutions resulting from projects e.g. through pre-commercial public procurement or public procurement for innovative solutions. The project proposals could already indicate which interested regions/countries or other partners have been pre-identified for contact during the project. Please note, however, that reference to such additional or follow-up funding will not lead automatically to a higher score in the evaluation of the proposal.

Open research data

Grant beneficiaries under this work programme part will engage in research data sharing by default, as stipulated under Article 29.3 of the Horizon 2020 Model Grant Agreement (including the creation of a Data Management Plan). Participants may however opt out of these arrangements, both before and after the signature of the grant agreement. More information can be found under General Annex L of the work programme.

All activities funded under this work programme part are encouraged – wherever applicable – to use data resulting from or made available through different initiatives of the European Commission. In particular, the utilisation of GEOSS (Global Earth Observation System of Systems)⁶ and Copernicus (the European Earth Observation Programme)⁷ data, products and information should be privileged⁸, as well as the geo-localization services and data provided by EGNOS and Galileo (the EU GNSS programmes), standalone or in synergy with Copernicus⁹. Applicants are also encouraged to make use of GALILEO services that are progressively becoming available. Likewise, in line with EU cooperation with the European Space Agency (ESA), activities should use ESA Earth Science data as far as possible. The data, both from ESA missions or third party missions, are for the vast majority of cases available for free web download (further details are available at <http://eopi.esa.int>). All activities related to Earth observation data and other spatial data should comply at best with

⁶ <http://www.geoportal.org>

⁷ www.copernicus.eu

⁸ Copernicus data and products, where available, should be used by the research and innovation community following the free, full and open access approach approved in the Commission Delegated Regulation (EU) No 1159/2013 of 12 July 2013. This would include the data from the Copernicus space infrastructure (Sentinels missions) and where affordable, the Copernicus Contribution mission data, when the latter can be of use for Horizon projects developing new Copernicus Services. Applicants are advised to consult information on the availability of Copernicus Sentinel Data and access to Copernicus Contributing Mission data on the Commission's website: http://ec.europa.eu/growth/sectors/space/research/index_en.htm. Where possible, proposers are also encouraged to use the Earth Observation Data Warehouse: <http://copernicusdata.esa.int/web/cscda/home>.

⁹ Several combined GNSS/Earth Observation applications have been identified, many of them in the area of land, forestry and farm management.

and build upon the existing Infrastructure for Spatial Information in the European Community (INSPIRE)¹⁰.

Beneficiaries are invited to follow the GEOSS Data Sharing Principles and to register in GEOSS the geospatial data, metadata and information generated as foreground of the project. Further information on GEOSS can be found from: <http://www.earthobservations.org>.

Beneficiaries are also encouraged to use FIWARE for some or all of their platform developments, when relevant. FIWARE enablers are available at www.fiware.org under open source licence for business use. Free online training, a sand-box environment and technical support are available; equally, proposers may contribute to the evolution of FIWARE.

Where appropriate, projects should support the implementation and evaluation of technology verification schemes, including the EU Environmental Technology Verification Pilot (ETV) programme¹¹.

Contribution to focus area(s)

Focus Area 'Building a low-carbon, climate resilient future' (LC): EUR 426.00 million

Focus Area 'Connecting economic and environmental gains - the Circular Economy' (CE): EUR 306.00 million

¹⁰ <http://inspire.ec.europa.eu/>

¹¹ https://ec.europa.eu/environment/ecoap/etv_en

Call - Building a low-carbon, climate resilient future: climate action in support of the Paris Agreement

H2020-LC-CLA-2018-2019-2020

The COP21 Paris Agreement¹² (PA) marked the beginning of a new era in the fight against climate change. Governments agreed to limit global temperature rise to well below 2°C and to make efforts to limit this to 1.5°C, as well as to enhance adaptive capacity, strengthening resilience and reducing vulnerabilities. This call contributes in its entirety to the Focus Area "Building a low-carbon climate-resilient future", which brings together funding to support the goals of the PA.

Actions in this call aim to produce solutions for the achievement of the PA's mitigation and adaptation goals, and to further relevant scientific knowledge for the implementation of the Nationally Determined Contributions (NDCs) and in advance of key PA-related milestones, such as the publication of national mid-century strategies (2020), the 6th IPCC assessment cycle (2018-2022) and the first global stocktake in 2023. Actions also support relevant EU policies and objectives, such as the Energy Union, Arctic policy, EU Adaptation Strategy and EU climate diplomacy efforts. Special consideration will be given to cooperation with strategic partner countries/regions. Specific efforts have to be paid to communicating research results to a broader audience, including the larger public. Ultimately, the actions are expected to support Europe's endeavours to implement not only the PA but also the Sustainable Development Goals (SDGs), particularly SDG 13 'Climate action', SDG 6 'Ensure availability and sustainable management of water and sanitation for all', SDG 11 'Sustainable cities and communities', SDG 14 'Life below water' and SDG 15 'Life on land'.

Decarbonisation

Proposals are invited against the following topic(s):

LC-CLA-01-2018: Supporting the development of climate policies to deliver on the Paris Agreement, through Integrated Assessment Models (IAMs)

Specific Challenge: Under the Paris Agreement (PA), Parties of the UNFCCC have to submit and periodically update Nationally Determined Contributions (NDCs), which represent their undertaking to pursue the objectives the Agreement. Parties have also committed to formulate and communicate their mid-century low greenhouse gas emission development strategies by 2020. The collective progress towards achieving the objectives of the PA will be periodically assessed, with the first 'global stocktake' envisaged to take place in 2023. These critical processes for global climate action must be underpinned by authoritative scientific results at national, regional and global level and supported by knowledge co-created through adequate frameworks that enhance legitimacy, inclusion, effectiveness and sustainability. Science should provide the necessary tools and knowledge-base in order to support the above

¹² http://unfccc.int/paris_agreement/items/9485.php

mentioned processes, and contribute to the high impact and quality of the major emitters' submissions.

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

a) Supporting the design and assessment of climate policies: Actions should provide new and more comprehensive scientific knowledge on the design, requirements, governance and impacts of climate action at national, European and global level, for the effective implementation of NDCs, the preparation of future action pledges, the development of 2050 decarbonisation strategies in major emitting countries and for supporting the 2023 global stocktake under the UNFCCC. The potential and feasibility for dynamically increasing decarbonisation ambition over time should be considered, together with related socio-economic impacts and co-benefits (for example those related to water, air pollution or avoided impacts of climate change), also taking into consideration market-driven actions. This action should be based on the use of ensembles of Integrated Assessment Models (IAMs), covering the entire economy, all greenhouse gases, and the wide range of climate, air quality/environment, energy and other sectoral policies contributing to decarbonisation, and should provide useful information at global and national level. Beyond the EU, proposals should extend their analysis to some major emitters outside Europe and to selected less developed countries.

b) Improving Integrated Assessment Models (IAMs): Actions should further improve the state-of-the-art of IAMs, in order to provide robust and transparent assessments to support the design and evaluation of all mitigation policies – including those on energy efficiency and renewables – in the short to mid-term, as well as to address the challenges and opportunities related to long term decarbonisation with a time horizon beyond 2050. Improvements in one or more of the following areas should be addressed: sectoral coverage across the entire economy (including more accurate representation of bunker fuels and land-based emissions/sinks), inclusion of all greenhouse gases, representation of issues such as structural and behavioural change and uncertainty, inequality, interaction with other relevant development goals, negative emission technologies, co-benefits of actions due to avoided impacts and reduced adaptation needs. Furthermore, actions should also improve the geographical coverage of global models including through in-country development of national modelling capacity.

Under both a) and b) subtopics and in line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged with major emitters and with less developed countries requiring support for the design and implementation of current and future NDCs.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 million and EUR 7 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- supporting EU climate policy and the preparation of EU submissions to the UNFCCC and the 2023 global stocktake exercise under the UNFCCC;
- major international scientific assessments such as the IPCC reports;
- enhanced international cooperation
- fostering innovative policy-making through robust methodologies and tools and reduction of uncertainties;
- improved legitimacy of models, methods and tools through greater transparency.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

LC-CLA-02-2019: Negative emissions and land-use based mitigation assessment

Specific Challenge: Most low-carbon pathways leading to well below 2°C (or 1.5°C) stabilisation of the global temperature – in line with the Paris Agreement goals – include negative emissions to compensate for residual emissions and/or temperature overshoot and highlight the critical role of land-use based mitigation. There is therefore a need to quantitatively assess the potential, effectiveness and impacts of negative emission technologies/practices and of land-use mitigation options, in achieving the long-term goals of the Paris Agreement, as well as linking these to what it would mean for concrete policy challenges.

Scope: Actions 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, food security, 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.

For both of the sub-topics, in line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged.

For both of the sub-topics, actions should envisage resources for clustering with other actions funded under this topic.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 million and EUR 7 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- major international scientific assessments such as the IPCC reports and the IPBES, as well as to national and EU impact assessments of possible mitigation options;
- developing a comprehensive medium-to-long term vision and analytical framework on pathways to achieve climate neutrality¹³ in the perspective of reaching the PA goals;
- improved ex-post, spatially explicit monitoring of the mitigation performance of the land sector;
- enhanced international cooperation.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Climate adaptation, impacts and services

Proposals are invited against the following topic(s):

LC-CLA-03-2018: Climate change impacts in Europe

Specific Challenge: Climate change is likely to make it harder to address *inter alia* poverty, disease, food and water insecurity in Europe. Rising temperatures and changing precipitation will affect the availability of food, energy and water, leading to likely increased volatility in food prices, and heightened regional tensions, affecting international stability and security. An increased frequency and/or intensity of extreme weather events may adversely affect human, animal and plant health, disrupt the flow of natural resources and commodities, and threaten infrastructure globally. Moreover, the inherent uncertainty of climate impacts is likely to increase risks for the business and financial sectors.

¹³ i.e. the balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases, as mentioned in the Paris Agreement.

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

a) Climate change impacts on health in Europe: Actions should review, report and progress on the current state-of-the art knowledge on the 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 co-benefits from mitigation and early adaptation, target research actions to address key issues and identified research gaps¹⁴ 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. Applicants are encouraged to seek synergies with relevant actions under Societal Challenge 1.

b) Global climate change impacts from a European perspective: Actions should consider how direct and indirect impacts beyond European borders will affect supply and value chains of relevance for the European economy and society, and related sectors such as finance, business, infrastructure, resources and commodities. Actions should also consider how these impacts will affect relevant European policies, such as those on climate change, foreign affairs, security, agriculture and/or others, and analyse how perceived associated risks may further impact on Europe. Actions should consider different climate (including high-end) scenarios and undertake a risk analysis for Europe at the most appropriate geographic and time scales.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 million and EUR 7 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- improved capability in assessing impacts of climate change;
- enabling evidence-based decision making through better understanding of mitigation and adaptation costs and co-benefits, and of potential new climate-related pressures on the EU;
- enhanced information base relevant for the 2023 global stocktake exercise under the UNFCCC;
- informing major international scientific assessments such as the IPCC reports and the IPBES, as well as to EU and national adaptation strategies and plans;
- cohesive European resilience to climate change.

Type of Action: Research and Innovation action

¹⁴ e.g. see the 2016 USGCRP scientific report for the White House on "Climate Impacts on Human Health", <https://health2016.globalchange.gov/>

The conditions related to this topic are provided at the end of this call and in the General Annexes.

LC-CLA-04-2018: Resilience and sustainable reconstruction of historic areas to cope with climate change and hazard events

Specific Challenge: European historic areas¹⁵ and their surroundings, both in urban and rural environments, are increasingly affected by climate-change and various natural hazard events. Increasing their resilience through ‘preparedness’ interventions and securing their sustainable reconstruction in case of damage or destruction is essential to preserve their identity and economic, social and environmental functionality and to seamlessly transmit their historic value to new generations. However, interventions in historic areas are quite difficult and hence costly due to specific characteristics associated with heritage sites (such as artistic values, denser urban fabric, material compatibility requirements, higher vulnerability of materials and structures, difficulty in accessing the damaged areas, high symbolic values for communities involved, traditional lifestyles, etc.). Knowledge- and evidence-based approaches to resilience enhancement and reconstruction approaches are needed to increase the cost-effectiveness of these activities from the whole life cycle perspective.

Scope: Actions should establish how to implement the principle of building back better¹⁶ 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 hazards, including climate change related events, 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;

¹⁵ For the definition of historic areas please see UNESCO Recommendation concerning the Safeguarding and Contemporary Role of Historic Areas (1976) http://portal.unesco.org/en/ev.php-URL_ID=13133&URL_DO=DO_TOPIC&URL_SECTION=201.html '

¹⁶ See 2015 Sendai Framework for Disaster Risk Reduction, Priority 4 on “build back better in recovery, rehabilitation and reconstruction”.

- 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.

The participation of social sciences and humanities disciplines such as gender studies, architecture, archaeology, cultural anthropology, law, economics, governance, planning, cultural and historical studies, is considered essential to properly address the complex challenges of this topic. Consortia should also include societal stakeholders and community-based partners to find practical and durable solutions.

Actions should take into account activities addressed by other initiatives such as the EU Copernicus Climate Change Service and Copernicus Emergency Management Service, and provide added value.

Actions should envisage resources for clustering with other projects relevant to cultural heritage funded under previous, current and future Horizon 2020 calls within Societal Challenge 5. Proposals should also pay attention to the special call conditions for this topic.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 million and EUR 6 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- enhanced resilience and reduced vulnerability of historic areas to climate change and other natural hazards, also accounting for their synergistic impact;
- improved reconstruction and economic and social recovery of historic areas by local authorities and communities through the use of new knowledge and tools.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

LC-CLA-05-2019: Human dynamics of climate change

Specific Challenge: As climatic changes increasingly place populations under pressure, human beings are already adapting. However, less developed countries – particularly in Africa – are often less resilient to climate change and require the deployment of appropriate support to adaptation, including in the form of bespoke climate services tailored to users' needs. There is some evidence that climate change may already be playing a role in shaping population migration patterns around the world (e.g. Africa to Europe). It is important to make use of the wealth of available socio-economic and geophysical data to better understand these patterns in order to develop appropriate policy responses.

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 use¹⁷, 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 Energy¹⁸.

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.

For both of the sub-topics, in line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged¹⁹.

The participation of social sciences and humanities disciplines is encouraged to address the complex challenges of this topic, including challenges associated with relevant gender issues.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 million and EUR 7 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- better policy making for climate adaptation in partner countries and Europe;
- supporting international scientific assessments such as the IPCC Assessment Reports;
- stronger adaptive capacity and climate resilience.

¹⁷ Links may be established with the project(s) resulting from topic SFS-43-2017: Earth observation services for the monitoring of agricultural production in Africa.

¹⁸ COM (2017) 17 final: Joint Communication to the European Parliament and the Council for a renewed impetus of the Africa-EU Partnership: see <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52017JC0017&from=EN>

¹⁹ Proposals should pay attention to the special call conditions for this topic.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Inter-relations between climate change, biodiversity and ecosystem services

Proposals are invited against the following topic(s):

LC-CLA-06-2019: Inter-relations between climate change, biodiversity and ecosystem services

Specific Challenge: The Paris Agreement notes the importance of taking action to ensure the integrity of all ecosystems and the protection of biodiversity in the context of combatting climate change and adapting to its impacts. An improved understanding of the interactions and feedbacks between ecological processes and climate change, together with evidence-based guidance, is crucial for the development of appropriate solution-oriented strategies and measures for biodiversity conservation and cost-effective ecosystems-based climate change adaptation and mitigation. Furthermore, there are opportunities to let biodiversity and ecosystems benefit multidimensionally from climate change adaptation and mitigation, because intelligent climate policy can simultaneously reduce other environmental stresses, such as air pollution.

Scope: Actions should investigate at all relevant spatial and temporal scales the way that ecological processes, biodiversity (including terrestrial and/or marine ecosystems as appropriate) and ecosystem services are impacted, both directly and indirectly, by climate change. Actions should consider the interactions and feedbacks between climate change and biodiversity, ecosystem functions and services. The vulnerability of biodiversity and ecosystems functions and services to climate change should be investigated and modelled across a range of European (including other European territories) climatic and ecological regions; this includes human activities with relevance to climate change. They should account for social, ecological and economic aspects and climate change relevant stressors and sources of uncertainty. These should include tipping points and safe operating spaces. The role of nature-based solutions²⁰ in enhancing the efficiency and effectiveness of climate change adaptation and mitigation strategies should be assessed and synergies with other pollution-reducing environmental policies be explored. Work should build, as appropriate, on existing knowledge and activities such as relevant FP7/Horizon 2020 projects, European climate adaptation platforms and Copernicus Services, in particular on climate change, land monitoring and marine environmental monitoring, and contribute to long-term monitoring initiatives.

Projects should envisage resources for clustering with projects funded under the same topic and with ongoing and future projects funded under other relevant topics within Societal Challenge 5 and other parts of Horizon 2020.

²⁰ A definition is provided in the introductory text of this Work Programme

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged, in particular with CELAC²¹ countries.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 5 million to 7 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- more effective, integrated and evidence-based biodiversity conservation strategies and ecosystem management in the face of climate change;
- pushing the EU to the forefront in climate-change predictive capacity through models better accounting for the interactions and feedbacks between biodiversity, ecosystems and the climate system;
- more effective ecosystem-based adaptation and mitigation, through evidence-based design and implementation of systemic nature-based solutions ;
- enhanced ecosystem integrity, functionality, resilience and delivery of services;
- increased investment in nature-based solutions, and ecosystem conservation, restoration and management, to support climate change adaptation and mitigation strategies;
- underpinning the EU Nature Directives, EU Biodiversity Strategy, 7th Environment Action Programme, and the EU Strategy on adaptation to climate change;
- informing major international scientific assessments such as the IPCC reports and the IPBES;
- the protection, restoration and enhancement of natural capital in line with the work of the Convention on Biological Diversity (CBD), the Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services (IPBES), the Intergovernmental Panel on Climate Change (IPCC) and further relevant global processes and organisations.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

The Cryosphere

Proposals are invited against the following topic(s):

²¹ Community of Latin American and Caribbean States

LC-CLA-07-2019: The changing cryosphere: uncertainties, risks and opportunities

Specific Challenge: Globally, glaciers and the large ice sheets of Antarctica and Greenland are particularly vulnerable to climate change, risking a significant future contribution to changes in sea levels. At present, there are significant uncertainties, e.g. relating to their stability, which prevent an accurate assessment of their vulnerability. The 'Arctic amplification' of global warming is putting pressure on the ecosystems and communities of the region and having an impact at global level as well. The Arctic's fragile natural ecosystems and societies are under serious threat, and additional human activities, linked to the new economic opportunities that are made possible by climate change, are putting additional pressure on them.

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 shelf-ocean and sea-ice 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 and impacts on coastal communities, coastal ecosystems and critical infrastructure across the globe.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 8 to EUR 10 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

b) Changes in Arctic biodiversity (Research and Innovation action): Actions should identify and analyse major drivers and implications of changing biodiversity in the Arctic, such as the role of invasive species, and how vulnerable land and/or marine ecosystems are with respect to combined human and natural influences. Actions should assess the ecosystems' responses to both external and internal factors and how these responses are impacting on indigenous populations and local communities at socio-economic level. Actions should also identify adaptation strategies in relation to the changes in Arctic ecosystems.

The participation of social sciences and humanities disciplines is important for addressing the complex challenges of this topic.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 5 to EUR 6 million would allow this specific challenge to be addressed appropriately.

Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

c) Sustainable opportunities in a changing Arctic (Research and Innovation action):

Actions should assess the viability of new economic activities – such as resource exploitation, shipping and tourism – and their ecological and socio-economic impacts and feedbacks at various scales, and their impact on the provision of ecosystem services. Actions should investigate key processes with high societal and economic impacts and provide appropriate, solution-oriented adaptation and mitigation responses, as well as capacity building for sustainable livelihoods while considering – in a co-design approach – the needs, priorities and perspectives of indigenous populations, local communities and economic actors operating in the region.

The participation of social sciences and humanities disciplines is essential for addressing the complex challenges of this topic.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 5 to EUR 6 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

d) Arctic standards (Coordination and Support action): The action should propose guidelines and protocols to develop ‘Arctic standards’, also including the legal framework, based on the translation of research outcomes into cold-climate technologies and services with commercial potential and the assessment of the sustainability of associated processes and technologies. The action should cover a wide range of technologies and services that have the potential to bring broad social and economic benefits within and beyond the Arctic region. The action should also provide requirements on how to design, build, install, and operate equipment and services to safely perform activities in the Arctic and to respond to emergencies.

The participation of standardisation organisations is encouraged.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

For all of the above sub-topics, in line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged²², in

²² Proposals should pay attention to the special call conditions for this topic.

particular with countries – beyond the EU Member States and countries associated to Horizon 2020 – that took part in the first Arctic Science Ministerial of 28 September 2016²³.

Expected Impact: For projects addressing parts a), b) or c), the project results are expected to contribute to:

- the implementation of the new integrated EU policy for the Arctic²⁴;
- the IPCC assessments and other major regional and global initiatives;
- enhanced engagement of and the interaction with residents from local communities and indigenous societies.

For projects addressing part d), the project results are expected to contribute to:

- enhanced stakeholder capability to operate in cold climate environments;
- better servicing of the economic sectors that operate in the Arctic (e.g. shipping, tourism);
- promoting sustainable Arctic opportunities arising from climate change and supporting the leverage of regional (EU) funds into these opportunities;
- supporting the competitiveness of European industry, particularly SMEs, engaging in sustainable development of the Arctic.

Type of Action: Coordination and support action, Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Knowledge gaps

Proposals are invited against the following topic(s):

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

Specific Challenge: Better understanding of the key processes controlling the climate-Earth system is fundamental in order to further improve climate projections, reduce uncertainty in climate sensitivity calculations, enhance understanding of frequency and strength of extreme weather events, and assess more accurately the impacts of climate change related to the proximity, rate, reversibility and tipping points of abrupt climate change, and the identification of safe operating spaces. Furthermore, future climate scenarios strongly benefit

²³ i.e. the United States of America, Canada, the People's Republic of China, Japan, the Russian Federation, South Korea, New Zealand, India, Singapore, and Greenland; see https://www.arctic.gov/publications/other/supporting_arctic_science.html

²⁴ JOIN(2016) 21 final

from the combined use of models and paleo-reconstructions conducted in Polar Regions as they allow a better understanding of how the climate system worked, both regionally and globally, during abrupt climatic transitions and under warmer or colder than present day conditions.

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 and predictions: 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 predictions and constrain climate sensitivity estimates. Actions may cover processes such as cloud and aerosol dynamics and cloud-aerosol interactions, biogeochemical 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), troposphere-stratosphere coupling, external forcing and other relevant processes.

The Commission considers that proposals requesting a contribution from the EU of between EUR 6 million and EUR 8 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

b) Tipping points: Actions should result in better understanding of abrupt climate change, of climate-related Earth system tipping elements and their tipping points, and associated impacts. Actions should identify safe operating spaces, accompanied – where relevant – with long-term strategies for preventing or mitigating impacts. Actions should also advance the understanding of respective impacts and early warning indicators.

The Commission considers that proposals requesting a contribution from the EU of between EUR 6 million and EUR 8 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

c) Ice-core drilling in East Antarctica: Actions should build on the outcomes of the Horizon 2020 project 'Beyond EPICA' (<http://www.beyondepica.eu>), and contribute to the European endeavour which aims to obtain a 1.5 million year old ice-core from East Antarctica. This will allow to better constrain the climate response to future GHG emissions and to unravel key linkages between the carbon cycle, ice sheets, the oceans and the atmosphere.

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

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 10 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- supporting major international scientific assessments such as the IPCC;
- increase confidence in climate change projections;
- providing added-value to decision and policy makers;
- sustaining Europe's leadership in climate science.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Indicative topics for 2020

Decarbonisation:

LC-CLA-09-2020: Achieving long-term climate goals and sustainable development (deep decarbonisation pathways and sustainable development at national and global level; the role of lifestyle change and consumption patterns on climate change mitigation)

LC-CLA-10-2020: Innovative nature-based solutions for carbon neutral cities and improved air quality

Climate adaptation, impacts and services:

LC-CLA-11-2020: Advancing climate services (seasonal to sub-seasonal [S2D] and seasonal to decadal [S2D] forecasting; climate services prototypes)

LC-CLA-12-2020: Climate resilience of coastal cities

LC-CLA-13-2020: Pre-commercial procurement of solutions for climate change resilience

Inter-relations between climate change, biodiversity and ecosystems:

LC-CLA-14-2020: Understanding water-energy-food nexus and streamlining water-related policies

LC-CLA-15-2020: Nature based solutions for forest fires risk reduction and multi-hazard risk management in the E.U.

The Cryosphere:

LC-CLA-16-2020: Polar climate: understanding the polar processes in a global context

Knowledge gaps:

LC-CLA-17-2020: Developing the next generation of Earth System Models

Earth Observation:

LC-CLA-18-2020: GEOSS observations supporting the EU in its international commitment in the domain of climate change

LC-CLA-19-2020: Supporting the GEOSS Cold Regions Initiative

Conditions for the Call - Building a low-carbon, climate resilient future: climate action in support of the Paris Agreement

Opening date(s), deadline(s), indicative budget(s):²⁵

| Topics (Type of Action) | Budgets (EUR million) | | | Deadlines |
|------------------------------|-----------------------|-------|--------|---|
| | 2018 | 2019 | 2020 | |
| Opening: 07 Nov 2017 | | | | |
| LC-CLA-01-2018 (RIA) | 25.00 | | | 27 Feb 2018 (First Stage) 04 Sep 2018 (Second Stage) |
| LC-CLA-03-2018 (RIA) | 20.00 | | | |
| LC-CLA-04-2018 (RIA) | 18.00 | | | |
| LC-CLA-08-2018 (RIA) | 60.00 | | | |
| Opening: 14 Nov 2018 | | | | |
| LC-CLA-07-2019 (CSA) | | 2.00 | | 19 Feb 2019 |
| LC-CLA-02-2019 (RIA) | | 22.00 | | 19 Feb 2019 (First Stage) 04 Sep 2019 (Second Stage) |
| LC-CLA-05-2019 (RIA) | | 23.00 | | |
| LC-CLA-06-2019 (RIA) | | 25.00 | | |
| LC-CLA-07-2019 (RIA) | | 39.00 | | |
| Opening: To be defined | | | | |
| Focus area topic(s) for 2020 | | | 192.00 | To be defined |

²⁵ The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.

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

All deadlines are at 17.00.00 Brussels local time.

The deadline(s) in 2019 and 2020 are indicative and subject to separate financing decisions for 2019 and 2020.

The budget amounts for the 2018 budget are subject to the availability of the appropriations provided for in the draft budget for 2018 after the adoption of the budget 2018 by the budgetary authority or, if the budget is not adopted, as provided for in the system of provisional twelfths.

The budget amounts for the 2019 and 2020 budget are indicative and will be subject to separate financing decisions to cover the amounts to be allocated for 2019 and for 2020.

Horizon 2020 - Work Programme 2018-2020
Climate action, environment, resource efficiency and raw materials

| | | | | |
|---------------------------|--------|--------|--------|--|
| Overall indicative budget | 123.00 | 111.00 | 192.00 | |
|---------------------------|--------|--------|--------|--|

Indicative timetable for evaluation and grant agreement signature:

For single stage procedure:

- Information on the outcome of the evaluation: Maximum 5 months from the final date for submission; and
- Indicative date for the signing of grant agreements: Maximum 8 months from the final date for submission.

For two stage procedure:

- Information on the outcome of the evaluation: Maximum 3 months from the final date for submission for the first stage and maximum 5 months from the final date for submission for the second stage; and
- Indicative date for the signing of grant agreements: Maximum 8 months from the final date for submission of the second stage.

Eligibility and admissibility conditions: The conditions are described in General Annexes B and C of the work programme. The following exceptions apply:

| | |
|----------------|---|
| LC-CLA-04-2018 | Proposals must cover at least 3 historic areas from different Member States or Associated Countries and cover natural and climate change related hazards of relevance to different regions of Europe. |
| LC-CLA-05-2019 | Due to the specific challenge of this topic, in addition to the minimum number of participants set out in the General Annexes, proposals addressing sub-topic a) shall include at least three participants from at least two different African countries. |
| LC-CLA-07-2019 | Due to the specific challenge of this topic, in addition to the minimum number of participants set out in the General Annexes, proposals shall include at least two participants from third countries. |

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in General Annex H of the work programme.

Evaluation Procedure: The procedure for setting a priority order for proposals with the same score is given in General Annex H of the work programme.

The full evaluation procedure is described in the relevant [guide](#) published on the Participant Portal.

Consortium agreement:

| | |
|--|--|
| LC-CLA-01-2018, LC- CLA-02-2019, LC- CLA-03-2018, LC- CLA-04-2018, LC- CLA-05-2019, LC- CLA-06-2019, LC- CLA-07-2019, LC- CLA-08-2018 | Members of consortium are required to conclude a consortium agreement, in principle prior to the signature of the grant agreement. |
|--|--|

Call - Greening the economy in line with the Sustainable Development Goals (SDGs)

H2020-SC5-2018-2019-2020

This call focuses on moving to a greener, more resource efficient and climate-resilient economy in sync with the natural environment, demonstrating a strong commitment to supporting the UN's Sustainable Development Goals (SDGs).

Connecting economic and environmental gains - the circular economy

Further development of a sustainable, resource efficient and competitive economy will require a transition to a more circular economic model with products, processes, services and business models that are designed to maintain the value and utility of materials and resources in the economy for as long as possible. The circular economy solutions should combine a strong environmental rationale with a convincing business logic.

Actions in this part of the call aim in the medium term to substantially improve the efficiency of resource use (including energy and water), to minimise the production of waste and increase the use of resources originating from secondary sources – while avoiding adverse health effects – and to reduce pollution and greenhouse gas emissions. They intend to elucidate the role of design in product durability, enhance the capacity of cities to embrace circular economy approaches and support the transition to systemic, integrated solutions closing the cycles of resource use in the water sector. They will contribute to implementing the Circular Economy Action Plan²⁶ and key high-level EU priorities, including those addressing jobs, growth and investment, climate and energy, and a strengthened industrial base. Ultimately, they are expected to support Europe's endeavours to implement the Sustainable Development Goals (SDGs), particularly SDG 12 'Responsible consumption and production', SDG 6 'Ensure availability and sustainable management of water and sanitation for all', SDG 11 'Sustainable cities and communities' and SDG 13 'Take urgent action to combat climate change and its impacts' (and the goals of the Paris Agreement on climate change), together with the Habitat III New Urban Agenda.

The topics in this part of the call contribute to the focus area 'Connecting economic and environmental gains - the circular economy'.

It should be noted that a number of topics (with "CE-" in the topic identifier) in the 'Raw Materials' section of this call also contribute to the circular economy.

Proposals are invited against the following topic(s):

²⁶ COM(2015) 614 final

CE-SC5-01-2018: Methods to remove hazardous substances and contaminants from secondary raw materials

Specific Challenge: Reuse and recycling of many secondary raw materials continues to be low in the EU, while landfill and incineration rates remain high. The uptake and recyclability of secondary raw materials can be hampered by the presence of undesirable contaminants, additives and even substances of concern. The removal of such undesirable substances could improve the purity of the resulting secondary raw material and mitigate potential health and environmental concerns. In addition, the removal of these substances could increase the range of potential recycling and reuse applications for the 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 and overall environmental performance of the proposed solution should also be considered. The work should also produce recommendations on the design and manufacturing 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. Activities are expected to achieve TRL 5-6 by the end of the project.

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 million and EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- increased purity and/or desirable quality of secondary raw materials;
- an increased recycling rate for, and reduced landfill and incineration of, secondary raw materials;
- reduced risk of retaining hazardous substances in recycled materials, where relevant;
- the implementation of the EU Circular Economy Action Plan and the 7th Environment Action Programme;
- the Commission Strategy on Plastics in a Circular Economy²⁷ and to the implementation of the SPIRE PPP Roadmap, where relevant.

Type of Action: Research and Innovation action

²⁷ currently in preparation

The conditions related to this topic are provided at the end of this call and in the General Annexes.

CE-SC5-02-2018: Independent testing programme on premature obsolescence

Specific Challenge: Given resource constraints, lengthening the lifetime of products can play a major role in moving towards a circular economy. However, products may be designed in a way that adversely affects their lifetime or prevents upgradability. Identification of the factors that cause such premature obsolescence is also important because making products more durable and easier to repair, upgrade or remanufacture can represent a key factor of competitiveness. A longer lifetime for products has the potential to generate new economic activities and offer societal and environmental benefits, while at the same time spurring on innovation in existing business models. An action under Horizon 2020 to prepare an independent testing programme addressing product durability is included in the EU Action Plan for the Circular Economy²⁸.

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.

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 million and EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- development of products designed for durability, interoperability, repair and reuse;
- development of markets based on durability;
- reduced materials consumption and waste generation;

²⁸ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52015DC0614>

- reduced information asymmetry between producers and consumers regarding product durability;
- increased awareness and understanding of the types of design that may lead to premature obsolescence;
- the implementation of the EU Circular Economy Action Plan.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

CE-SC5-03-2018: Demonstrating systemic urban development for circular and regenerative cities

Specific Challenge: Cities struggle in their transition to implement a full circular economy model incorporating regenerative practices. There is a clear need for cities to become circular in order to alter urban consumption patterns and value chains, and to stimulate innovation, business opportunities, and job creation in both established and newly created sectors. New, more flexible systemic urban planning instruments enabling the design and implementation of circular urban processes would make urban and peri-urban areas regenerative and facilitate their adaptation to emerging economic, social and environmental challenges.

Scope: Actions should demonstrate how cities²⁹ 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 and semantic 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 while limiting pollution of the environment, for example by reducing the emissions of air pollutants. 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)

²⁹ For the purposes of this topic, the definition of a 'city' is to be understood according to the harmonised definition of a city established by the OECD and the European Commission, which can be found at: http://ec.europa.eu/regional_policy/sources/docgener/focus/2012_01_city.pdf

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 for Climate and Energy initiative, and in particular the regional component for Europe³⁰(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. They should also ensure that there will be no duplication with work undertaken by relevant projects funded under the topic 'CO-CREATION-02-2016 - User-driven innovation: value creation through design-enabled innovation'.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 10 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

³⁰ www.covenantofmayors.eu

Expected Impact: The project results are expected to contribute to:

- measurable reduction of materials, natural resource consumption and environmental footprint in urban and peri-urban areas;
- measurable increase of the regenerative capacity of urban and peri-urban areas due to a measurable increase in material and natural resource creation in cities, as well as increased productivity through maximisation of (multi)-functional use and programming of urban spaces;
- set of social behavioural, economic, environmental performance and geospatial indicators to monitor and assess the urban and peri-urban circularity and regenerative capacity;
- local governance innovation in response to the needs and concerns of stakeholders and the affected public as well as boosted creativity and entrepreneurship related to circularity and regenerative processes;
- the implementation of the EU Circular Economy Action Plan with a direct link to the urban fabric (built and public space), and the Habitat III New Urban Agenda's commitment to transition to a circular economy.

Type of Action: Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

CE-SC5-04-2019: Building a water-smart economy and society

Specific Challenge: There is a growing demand for water from various economic activities and increasing stress on natural water sources. To secure water for our society, there is therefore a need to make available alternative water resources of various qualities and which are appropriate for different functions and multiple users, and to better exploit water resources and all the valuable substances that could be obtained through the wastewater treatment and reuse process. However, innovations in this domain remain fragmented and/or only experimented at small scales; testing and deployment in operational environments and at scales suitable for encouraging wider uptake is still missing.

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 resource-efficient 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 might demonstrate 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 soil; and
- cost-effective and smart 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, also addressing the gender dimension, 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.

For both sub-topics, deployment of enabling digital solutions for the monitoring, control and optimisation of data and processes is also encouraged. Where appropriate, related regulatory and institutional barriers which prevent the wide application of developed innovative solutions should be addressed. Where technological innovation is concerned, TRL 5-7 should be achieved. 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, as well as SME participation.

The Commission considers that proposals requesting a contribution from the EU of between EUR 10 million and EUR 15 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- significantly reduced use of water from freshwater sources;
- improved recovery and use of resources (materials and water itself), including energy;
- mobilisation of water-related investments and synergies with other funding instruments.
- the creation of new business opportunities and increased competitiveness of EU industries;
- supporting, as appropriate, the implementation of EU water policies, the transition to a more circular economy at different scales and economic and social conditions³¹, water security, water use efficiency, enhanced resilience to climate change and achievement of the relevant Sustainable Development Goals;
- the implementation of the objectives of the EIP Water and, where appropriate, supporting the implementation and evaluation of technology verification schemes, including the EU Environmental Technology Verification Pilot (ETV) programme.

Type of Action: Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

CE-SC5-05-2018: Coordinated approaches to funding and promotion of research and innovation for the circular economy

Specific Challenge: Authorities throughout the EU continue to fund research and innovation in the field of circular economy at a national or regional level. Programme owners do so on the basis of their own mandates, though doubtlessly to a large extent in accordance with national and European priorities. Nevertheless, fragmentation of scarce resources, difficulties in implementing international synergies without a joint platform and lack of institutionalized outreach throughout Europe all hamper progress towards achieving common EU objectives. Moreover, the progress made in research and innovation underpinning circular economy varies throughout the EU.

This calls for a strategic approach to the coordination of objectives and programming of the regional, national and European funding programmes throughout the area of research and innovation for a circular economy. A strategic approach would help build international synergies among programme owners (in order to overcome and avoid fragmentation), and

³¹ part of this topic contributes to the roadmap of the SPIRE cPPP.

strengthen dissemination of lessons learned and new solutions for the circular economy resulting from currently isolated national programmes and funding.

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, summarising 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.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- alignment and coordination of regional, national and European programming of R&I in the area of the circular economy and associated environmental impacts;
- effective regional, national and European R&I funding in the field of the circular economy, with special attention to SMEs;
- accelerated diffusion of state-of-the-art circular economy solutions and best practices in circular economy R&I throughout Europe;
- implementation of national and EU-level action plans including the Circular Economy Action Plan³², the Green Action Plan for SMEs³³, and Eco-Innovation Action Plan³⁴.

Type of Action: Coordination and support action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

³² COM(2015) 614 final

³³ COM(2014) 440 final

³⁴ COM(2011) 899 final

Raw materials

The EU is highly dependent on raw materials that are crucial for a strong European industrial base, an essential building block of the EU's growth and competitiveness. The main aim of this part of the call will be on achieving the objectives and meeting the targets of the EIP on Raw Materials. A wide range of actions will cover the entire EU raw materials value chain, from sustainable exploration, extraction, processing to recycling. Actors from the whole EU raw materials innovation chain will be involved, including researchers, industry, end-users, public authorities and civil society.

In the short to medium term, innovation actions are expected to deliver pilot actions demonstrating sustainable production of primary and secondary raw materials, particularly CRM or other scarce high-tech metals. Breakthrough research concepts, as the basis of tomorrow's innovations, are also tackled through smaller, lower-TRL actions. Actions will also contribute to building the EU knowledge base of primary and secondary raw materials for solid decision making, and particularly to the further development of the EC Raw Materials Information System – RMIS³⁵, responding to the Circular Economy Action Plan and the objectives of the Strategic Implementation Plan of the EIP on Raw Materials. Policy-related actions aim at improving framework conditions for the sustainable development of and investment in innovative solutions in the EU. In the long term, actions should positively impact on: downstream industries' access to raw materials; employment in and competitiveness of the EU raw materials and related manufacturing industries, including SMEs; the environmental and social performance of the raw materials sector; and improved public awareness, acceptance and trust. International co-operation is encouraged in all actions. Ultimately, the actions on raw materials are expected to support Europe's endeavours to implement the Sustainable Development Goals (SDGs), notably SDG 12 'Responsible Consumption and Production'.

Topics relevant to bio-based materials (e.g. wood) and the bio-economy can be also found in Societal Challenge 2 'Food security, sustainable agriculture and forestry, marine, maritime and inland water research, and the bio-economy' and the Joint Undertaking for Bio-Based Industries (BBI). Innovation actions with relevance to raw materials can be found in the calls under the SPIRE PPP.

Topics in this part of the call that contribute to the focus area 'Connecting economic and environmental gains - the circular economy' (prefix 'CE') will contribute to the implementation of the EU Circular Economy Action Plan.

Proposals are invited against the following topic(s):

CE-SC5-06-2018: New technologies for the enhanced recovery of by-products

Specific Challenge: Securing the sustainable access to raw materials, including metals, industrial minerals and construction raw materials, and particularly Critical Raw Materials

³⁵ <https://ec.europa.eu/jrc/en/scientific-tool/raw-materials-information-system>

(CRM), is of high importance for the EU economy. There is a need for innovative and sustainable raw materials production solutions at lower TRLs to increase the range and quality of raw materials recovered from primary and secondary resources.

This specific challenge is identified in the Priority Area 'Technologies for primary and secondary raw materials production' of the European Innovation Partnership (EIP) on Raw Materials.

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

Actions should develop sustainable solutions finishing at the level of Technology Readiness Levels (TRL) 3-5.

Actions should evaluate the potential by-products³⁶ 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 – RMIS³⁷. 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.

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 million and EUR 7 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

³⁶ The term "by-products" should be interpreted here as the constituents usually accompanying the major component(s) of a raw material at low concentrations.

³⁷ <https://ec.europa.eu/jrc/en/scientific-tool/raw-materials-information-system>

- pushing the EU to the forefront in the area of raw materials processing technologies and solutions through generated know-how (planned patents, publications in high impact journals and joint public-private publications etc.);
- significantly increased process selectivity, broader range and higher recovery rates of valuable raw materials, particularly critical raw materials, thereby unlocking substantial reserves of new or currently unexploited/underexploited resources within the EU;
- significantly increased economic performance in terms of higher material-, water-, energy- and cost-efficiency and flexibility in minerals processing, metallurgical or recycling processes;
- in the longer term, improving the competitiveness of and creating added value and new jobs in raw materials processing, refining, equipment manufacturing and downstream industries;
- improving significantly the health, safety and environmental performance of the operations throughout the whole life cycle which is considered, including a reduction in waste, wastewater and emissions generation and a better recovery of resources from generated waste.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

CE-SC5-07-2018-2019-2020: Raw materials innovation for the circular economy: sustainable processing, reuse, recycling and recovery schemes³⁸

Specific Challenge: Securing the sustainable access to raw materials, including metals, industrial minerals, wood- and rubber-based, construction and forest-based raw materials, and particularly Critical Raw Materials (CRM), is of high importance for the EU economy. Complex primary and secondary resources contain many different raw materials. Their processing, reuse, recycling and recovery schemes are complex and imply different steps, ranging from collection, logistics, sorting and separation to cleaning, refining and purification of materials.

The challenge for industry is to scale up promising raw materials production technologies and to demonstrate that raw materials can be produced in an innovative and sustainable way in order to make sure that research and innovation end up on the market, to strengthen the competitiveness of the European raw materials industries, meet ambitious energy and climate targets for 2030, minimise environmental impacts and risks, and gain the trust of EU citizens in the raw materials sector.

³⁸ It is expected that this topic will continue in 2020.

This specific challenge addresses the development of "innovative pilot actions"³⁹, which is one of the major targets of the European Innovation Partnership (EIP) on Raw Materials.

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 – RMIS⁴⁰. 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 industrially- and 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 NPV⁴¹) 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.

The Commission considers that proposals requesting a contribution from the EU of between EUR 8 million and EUR 13 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

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:

³⁹ <https://ec.europa.eu/eip/raw-materials/en/content/strategic-implementation-plan-sip-0#Targets>

⁴⁰ <https://ec.europa.eu/jrc/en/scientific-tool/raw-materials-information-system>

⁴¹ Capital expenditures (CAPEX), operational expenditure (OPEX), internal rate of return (IRR), and net present value (NPV)

a) Sustainable processing and refining of primary and/or secondary raw materials (2018, 2019): 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 processing of and 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 (2018, 2019): Actions should develop and demonstrate novel and environmentally sound 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 (2018, 2019): Actions should develop and demonstrate novel solutions for a high-value recovery of raw materials from buildings. Actions should also benchmark against 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 Protocol⁴², 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 (2018, 2019): 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.

Expected Impact: The project results are expected to contribute to:

⁴² <http://ec.europa.eu/DocsRoom/documents/20509/attachments/1/translations/en/renditions/native>

- pushing the EU to the forefront in the area of raw materials processing and/or recycling technologies and solutions through generated know-how (planned patents, publications in high impact journals and joint public-private publications etc.);
- improving significantly the economic viability and market potential that will be gained through the pilot, leading to expanding the business across the EU after the project is finished, as well as creating added value and new jobs in raw materials producing, equipment manufacturing and/or downstream industries;
- unlocking a significant volume of various primary/secondary raw materials currently unexploited/underexploited within the EU, hence improving their 'circularity' in the economy;
- improving significantly the health, safety and environmental performance throughout the whole life cycle considered, including better energy and water efficiency, a reduction in waste generation and wastewater and a better recovery of resources from generated waste or a better recovery and recycling of resources from complex end-of-life products;
- additionally, only for sub-topic b) 'Recycling of raw materials from end-of-life products', in the shorter term, increasing measurably the efficiency and effectiveness (range, yield, quality and selectivity of recovered materials) of the exploitation of complex and heterogeneous secondary raw materials deposits ('urban mines') when compared to the state of the art;
- additionally, only for sub-topic c) 'Recycling of raw materials from buildings', lead to wider application of smart demolition techniques, C&DW processing, quality assurance practices, traceability and standardization for secondary raw materials in the construction sector, thus improving the material and value recovery rate.

Type of Action: Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

CE-SC5-08-2018-2019-2020: Raw materials policy support actions for the circular economy⁴³

Specific Challenge: In order to secure the sustainable access to primary and secondary raw materials, including metals, industrial minerals, construction raw materials, wood, and particularly Critical Raw Materials (CRMs) for the EU economy, there is a need to tackle a number of specific non-technological challenges at local, regional, national, EU and global levels.

Illegal shipments of waste, both within the EU and to non-EU countries, and poor recycling have adverse effects on human health and the environment, create unfair competition for law

⁴³ It is expected that this topic will continue in 2020.

abiding operators and give rise to the loss of valuable resources in the case of poor or no treatment. However, port authorities and enforcement authorities have limited resources to control the ever increasing amount of material shipped and this without blocking normal traffic. In addition, at the moment there is no distinction in customs codes between “new goods” and “second hand goods” which implies that illegal waste shipments are often disguised as “second hand goods”.

Currently, at most only one third of waste wood is recycled, the rest being landfilled or incinerated and there are great differences between Member States in wood recycling performance. Increasing production costs combined with stagnating product prices in recent years have put pressure on the profit margins of the EU woodworking industries, mostly dominated by SMEs. There is a need for higher resource efficiency and increased use of recycled wood in wood processing that can provide measurable improvements in company profitability.

Requirements for responsible sourcing in the raw materials value chain have recently been strengthened in one aspect by the new EU Conflict Minerals legislation. However, the need for the industry to engage in responsible sourcing and responsible business conduct and to perform relevant due diligence goes beyond legislative obligations – it is rooted in the growing expectations of consumers, civil society, governments and procurement managers (buyers). While it is very difficult for individual operators to meet such expectations due to the limited availability of the necessary information, downstream industries increasingly require all operators in their supply chain to address risks by performing due diligence. Responsible sourcing of raw materials is becoming a new business reality; in the short term it may offer a competitive advantage to frontrunners and in the long term, it could become a necessary "license to operate" and, given the global character of today's supply chains, it is also a way to be integrated in global supply chains.

Scope: All actions should contribute to building the EU knowledge base of primary and secondary raw materials (EC Raw Materials Information System – RMIS⁴⁴).

Actions should include a task to cluster with other relevant projects in the field funded by Horizon 2020, in support of the EIP on Raw Materials.

Actions should address only one of the following sub-topics⁴⁵:

a) Voluntary scheme for certification of treatment facilities for key types of wastes (2018): Actions should develop and launch a voluntary scheme for certification – including verification – of treatment facilities for key types of waste/recyclates containing significant amounts of critical raw materials (e.g. electronic waste and/or waste batteries). The scheme should integrate measurable and verifiable minimum quality standards and a verification procedure based on traceability through the supply chain from collection to end-processing. Participation of relevant stakeholders – including waste holders, dealers, brokers and

⁴⁴ <https://ec.europa.eu/jrc/en/scientific-tool/raw-materials-information-system>

⁴⁵ Proposals should pay attention to the specific call conditions for this topic

operators of treatment facilities – from the conception phase of the scheme should be ensured. Full compliance with applicable WTO rules and with the rules and principles of the Basel Convention should be ensured, and existing certification schemes for waste should be taken into account.

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

The Commission considers that for this sub-topic, proposals requesting a contribution from the EU of up to EUR 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

b) Resource efficiency in wood processing, recovery and recycling (2018): Actions should identify, assess and document existing practices in a representative set of EU Member States/Associated Countries and possibly third countries, and create a network to widely disseminate and transfer good practices covering both issues: resource-efficient wood processing and wood waste recycling. Resource-efficient wood processing in the woodworking sector should improve companies' operational performance and hence the EU sector's overall competitiveness. Quality-oriented and cost-efficient wood waste collection systems, sorting and recycling, and design solutions should facilitate increased wood recycling together with increased product quality and market acceptance of recovered wood in new products. Involvement of relevant stakeholders across value chains is necessary, including wood processing industries, research & innovation institutes, woodworking products end-users, municipalities and other parties dealing with wood waste collection, sorting and recycling. Actions should also assess trade-offs between wood waste use for material and energy. This assessment should be based on life cycle analysis and all sustainability pillars, and consider impacts on sustainable forest operations and ecosystems integrity (for all major EU forest regions) and impacts of intra-EU trade⁴⁶. Proposals should include the participation of industrial SMEs, as far as possible.

The Commission considers that for this sub-topic, proposals requesting a contribution from the EU of up to EUR 3 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

c) Responsible sourcing of raw materials in global value chains (2019): Actions should create a global business and stakeholder platform for exchange of information and the promotion of responsible sourcing and responsible business conduct involving a network of key international experts and stakeholders. The aim is to engage governmental and corporate partners from the EU/Associated Countries and third countries in developing a globally acceptable concept of a responsible sourcing in minerals and metals value chains.

⁴⁶ For example, country grouping applied by Forest Europe or other equivalent methodology

The platform should develop ideas for creating incentives for responsible sourcing in raw materials value chains, strengthen EU outreach to third countries to promote the concept in intergovernmental forums and to establish responsible sourcing in EU business practice. Interaction with other related existing platforms, networks and initiatives is encouraged. Actions should consider the relevant aspects related to environmental sustainability.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged, particularly with partners from advanced countries using raw materials⁴⁷.

The Commission considers that for this sub-topic, proposals requesting a contribution from the EU of up to EUR 3 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

sub-topic a)

- achieving the objectives and the implementation of both the Raw Materials Initiative⁴⁸ and the EIP on Raw Materials, in particular in terms of strengthening the enforcement of the Waste Shipment Regulation and improving access to critical raw materials (CRMs);
- increased recovery rates in the EU as regards key types of waste/recyclates containing significant amounts of CRMs;
- in the longer term, reduced EU dependency on imports of CRMs;
- creating added value and new jobs in metallurgy, equipment manufacturing and/or downstream industries;
- improving the environmental (control of emissions, residues, effluents), health and safety performance of operations throughout the whole life cycle;

sub-topic b)

- achieving the objectives and the implementation of the EU Forest Strategy⁴⁹, Circular Economy Action Plan and the EIP on Raw Materials on resource-efficient use of resources;
- improving knowledge and conditions for efficient wood processing when compared to the state of the art, resulting in increased competitiveness of the EU woodworking industries;

⁴⁷ Proposals should pay attention to the specific call conditions for this topic

⁴⁸ http://ec.europa.eu/growth/sectors/raw-materials/policy-strategy/index_en.htm

⁴⁹ COM(2013)659

- increased wood waste recycling across the EU (including from furniture, construction and demolition, packaging, household) and increased acceptance in the use of secondary wood;
- better informed decision-making at EU, national and local levels in the private and public sectors on wood recycling and resource efficiency; and improved knowledge of EU stakeholders about proposed solutions, including authorities involved in wood recycling;
- in the medium and long term, creating added value and new jobs and increasing the overall competitiveness of the EU woodworking industries and related value-chains through an uptake of resource-, water- and energy-efficient solutions;

sub-topic c)

- achieving the objectives of both the Raw Materials Initiative⁵⁰ and the EIP on Raw Materials in terms of the access and responsible sourcing of raw materials;
- improved awareness of consumers/corporates and improved perception of responsible sourcing as a source of competitive advantage through more responsible sourcing and responsible business conduct initiatives with regards to raw materials;
- increased visibility of responsible sourcing in global political agenda-setting and emergence of a globally accepted definition of responsible sourcing.

Type of Action: Coordination and support action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

SC5-09-2018-2019: New solutions for the sustainable production of raw materials

Specific Challenge: Securing sustainable access to raw materials, including metals, industrial minerals and construction raw materials, and particularly Critical Raw Materials (CRM), is of high importance for the EU economy. However, the EU is confronted with a number of technological and environmental challenges along the entire production value chain of primary and secondary raw materials. There is also a need for very innovative and sustainable raw materials production solutions at lower TRLs to bring the next 'digital generation' to the raw materials field.

This specific challenge is identified in the Priority Area 'Technologies for primary and secondary raw materials production' of the European Innovation Partnership (EIP) on Raw Materials.

⁵⁰ http://ec.europa.eu/growth/sectors/raw-materials/policy-strategy/index_en.htm

Scope: All actions should develop sustainable and resource-efficient solutions through industrially- and user-driven multidisciplinary consortia covering the relevant value chain of non-energy non-agricultural raw materials.

Actions should develop technological solutions finishing at the level of Technology Readiness Levels (TRL) 3-5.

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 – RMIS⁵¹. 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.

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

a) Breakthrough concepts and solutions for sustainable exploration, mining and/or processing (2018): Actions should develop ground-breaking concepts and solutions for exploration, mining and/or raw materials processing to secure the sustainable access to abiotic raw materials for the EU in the long term and to gain the trust of society in clean and safe production of raw materials. Recycling of end-of-life products is excluded from this topic. Solutions for marine mineral resources are also excluded from this sub-topic.

b) Digital mine (2019): Actions should develop an Industrial Internet of Things (IIoT) platform to significantly enhance the efficiency of mining operations by connecting cyber and physical systems and devices to extract valuable insights from their data, in order to improve the decision-making process, better address customer requirements, and to address health and safety aspects, environmental performance, increased automation, predictive maintenance, resource efficiency and real-time coordination of operations. Usage scenarios for mining operations should be presented to demonstrate the viability of the proposed IIoT approach. Actions should promote the adoption of IIoT platforms in the mining sector at EU level.

c) Recovery of metals and minerals from sea resources (2019): Actions should develop new technological solutions for the processing of minerals and metals from sea resources, including seawater brines, and/or the seabed in a sustainable way addressing the challenges of industrial viability of the whole process and accessibility, and responsibly addressing the environmental impacts. In the case of minerals and metals dissolved in sea water, actions

⁵¹ <https://ec.europa.eu/jrc/en/scientific-tool/raw-materials-information-system>

should demonstrate the technological feasibility and cost-effectiveness of highly efficient and effective recovery processes.

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 million and EUR 7 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- pushing the EU to the forefront in the relevant areas through generated know how (planned patents, publications in high impact journals and joint public-private publications etc.);
- safeguarding environmental sustainability (including better energy and water efficiency and a reduction in waste, wastewater and emissions) and improving significantly the health and safety performance of the solutions provided throughout the whole life cycle considered;
- creating a lower TRL technology base for radical innovations within the next decades in the sectors concerned that would help unlock substantial reserves of new or currently unexploited resources within the EU;
- in the longer term, improving the economic viability of operations and enhancing the competitiveness of, and creating added value and new jobs in raw materials producing, equipment manufacturing, information and communication technologies and/or downstream industries.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

SC5-10-2019-2020: Raw materials innovation actions: exploration and Earth observation in support of sustainable mining⁵²

Specific Challenge: Securing the sustainable access to raw materials, including metals, industrial minerals and construction raw materials, and particularly Critical Raw Materials (CRM), is of high importance for the EU economy.

The challenge for industry is to scale up promising raw materials production technologies, including for exploration, and to demonstrate that raw materials can be produced in an innovative and sustainable way in order to ensure that research and innovation end up on the market, to strengthen the competitiveness of the European raw materials industries, to meet the ambitious energy and climate targets for 2030, to minimise environmental impacts and risks and to gain the trust of EU citizens in the raw materials sector.

⁵² It is expected that this topic will continue in 2020.

This specific challenge addresses the development of "innovative pilot actions"⁵³ which is one of the major targets of the European Innovation Partnership (EIP) on Raw Materials.

Scope: Actions should develop innovative pilots demonstrating clean and sustainable production, including exploration, 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 objectives and targets 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 – RMIS⁵⁴. 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, duly taking into account the applicable EU environmental legislation.

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

All proposals should justify the relevance of the 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 proposals should include an outline of the initial exploitation and business plans (with indicated CAPEX, OPEX, IRR and NPV⁵⁵) with clarified management of intellectual property rights, and commitment to the first exploitation.

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

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

a) Integrated exploration solutions (2019): Actions should develop and demonstrate integrated exploration solutions focused on finding new deep land deposits. They could benefit from any of the advanced geological-geochemical-geophysical-remote sensing integrated (and multi-method) approaches, 3D and 4D modelling, automation and robotisation. Solutions should cover and be tested in both green and brown field mining sites.

⁵³ <https://ec.europa.eu/eip/raw-materials/en/content/strategic-implementation-plan-sip-0#Targets>

⁵⁴ <https://ec.europa.eu/jrc/en/scientific-tool/raw-materials-information-system>

⁵⁵ Capital expenditures (CAPEX), operational expenditure (OPEX), internal rate of return (IRR), and net present value (NPV)

b) Services and products for the extractive industries life cycle (2019): Actions should develop services and products based on Earth observation data and techniques and GNSS services for the extractive industries life cycle. The services and products should be built upon information and data made available by the Copernicus Programme, and other relevant Earth observation and proximal sensing data. Use of data made available by EGNOS (and in the long term, Galileo) or other relevant Earth GNSS data should be considered where relevant. Services should be developed and tested for any of the different phases of the mining life cycle: exploration, extraction, closure or post closure. Particular attention should be given to services for environmental monitoring (including metals dispersion) and safety and security monitoring associated with open pits (slopes stability/landslides risk), underground mining (e.g. subsidence) and mining waste disposal (e.g. tailings dams and dumps). Services to be developed should include the design and testing of early warning systems and associated monitoring plans to prevent and mitigate risks associated with extraction and mining waste disposal⁵⁶.

The Commission considers that proposals requesting a contribution from the EU of between EUR 8 million and EUR 13 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- pushing the EU to the forefront in the area of sustainable raw materials production technologies and solutions through generated know how (planned patents, publications in high impact journals and joint public-private publications etc.);
- increasing the reserves of various primary raw materials within the EU;
- where relevant, reducing the exploration costs for the industry through new cost-effective exploration technologies, while safeguarding long- and short-term environmental sustainability;
- improving the resolution and interoperability of existing raw materials digital maps;
- in the longer term, improving the competitiveness of and creating added value and new jobs in raw materials producing, equipment manufacturing, information and communication technologies and/or downstream industries;
- additionally, only for b) 'Services and products for the extractive industries life cycle', improved validation of global Copernicus land use and land cover products, enhancing the market uptake of the Copernicus based services and products for mining lifecycle, as well as its synergetic use with GNSS.

⁵⁶ SWD(2016) 205 final/2 Action Plan on the Sendai Framework for Disaster Risk Reduction 2015-2030. A disaster risk-informed approach for all EU policies, as well as Directive 2006/21/EC on the management of waste resulting from extractive industries

Type of Action: Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Water for our environment, economy and society

Changes in water availability, the frequency of floods and droughts due to climate and other environmental changes, pollution trends, increased competition in water use including for industry, energy, agriculture and food production, land-use changes and increasing urbanisation all require the development and implementation of robust, smart, effective and tailored water management systems, solutions and multi-sectoral governance models in Europe and globally. The transformative potential of digital technologies can play an important role in doing so.

This part of the call supports and aims to accelerate the implementation of EU policies⁵⁷ and initiatives⁵⁸ relating to water, resource efficiency and water-dependent industries, while also contributing to policy relating to the Energy Union, climate action and the digital economy. Overall, actions are expected to lead in the medium term to: digital solutions for improved public- and private-sector decision-making on water-related risks, efficiency and resilience; substantial reductions in water and energy consumption; and the development of new markets for water-smart technologies and services. A further action focuses on EU-India cooperation to improve wastewater efficiency and quality of and access to drinking water in India. Ultimately, actions are expected to support Europe's endeavours to implement the Sustainable Development Goals (SDGs), particularly SDG 6 'Clean water and sanitation' and SDG 13 'Climate action'.

It should be noted that topic CE-SC5-04-2019 'Building a water-smart economy and society' in this call, as well as topics in the call 'Building a low-carbon, climate resilient future: climate action in support of the Paris Agreement' also contribute to this priority. Relevant actions are also called for under the SPIRE cPPP in the LEIT-NMBP part of this Work Programme.

Proposals are invited against the following topic(s):

SC5-11-2018: Digital solutions for water: linking the physical and digital world for water solutions

Specific Challenge: Modern information and communication technologies (ICT) have provided today's society with a vast array of innovative capabilities to solve several challenges related to resource efficiency, climate change and sustainable development. Harnessing this technology within the water sector creates a more intelligent means of managing and protecting the planet's water resources and lays the foundation of a water-smart society. However, several challenges related to interoperability and standardisation,

⁵⁷ http://ec.europa.eu/environment/water/index_en.htm

⁵⁸ e.g. EIP Water, <http://ec.europa.eu/environment/water/innovationpartnership/>

collection, protection and sharing of data between users, services and infrastructures, intelligent smart metering, integration with other systems, ICT governance and public awareness and acceptance, are hampering the potential of those technologies.

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 capitalise on knowledge acquired through previous FP7/Horizon 2020 projects.

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. Activities are expected to focus on Technology Readiness Levels (TRLs) 5-7. The participation of social sciences and humanities disciplines is crucial to properly address the complex challenges of this topic. 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.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- the interoperability of decision support systems through the identification and use of ICT/water vocabularies and ontologies in view of developing or improving ICT/water standards;
- improved decision making on water management, related risks and resource efficiency through increased real-time accuracy of knowledge;
- maximising return on investments through reduced operational costs for water utilities, including reduced costs for water monitoring, improved performance of water infrastructures, and enhanced access to and interoperability of data;

- enhanced public awareness on water consumption and usage savings;
- market development of integrated and cyber-resilient ICT solutions and systems for smart water management, and opening up of a digital single market for water services.
- the implementation of the objectives of the EIP Water, especially, reducing the environmental footprint of the main water-dependant activities and improve their resilience to climate changes and other environmental changes.

Type of Action: Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

SC5-12-2018: EU-India water co-operation

Specific Challenge: In recent years, India and Europe have collaborated extensively to enhance and enrich each other's technological and scientific knowledge and management capacities to cope with increasing stress on water resources. Increasing heterogeneity in the uneven distribution of water resources triggered by climate change, extreme water-related events (floods and droughts) and increasing demand due to population growth and economic development add additional stress to water, environment and food security and to the national economy. Many of these water challenges are common to India and some of the EU Member States. Therefore there is a need for a concerted effort of India and EU to address these issues. This will also help in achieving the Sustainable Development Goals' (SDGs) agenda on water.

Scope: This action should develop new and/or adapt the most suitable existing innovative and affordable solutions for Indian conditions, both in urban and rural areas, addressing one or more of the following broad challenges:

- drinking water purification with a focus on emerging pollutants;
- waste water treatment, with scope for resource/energy recovery, reuse, recycle and rainwater harvesting, including bioremediation technologies;
- real time monitoring and control systems in distribution and treatment systems.

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) also need to 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 decentralised water treatment and wastewater treatment and recycling systems, including the improvement

of sewage collection and urban drainage systems. Water and energy efficient and cost-effective 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 also need to 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, fertilisers, 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 social communities, and consideration of possible gender differences in the use and need of water, is essential in order to enable a strong demonstration component involving transfer of European knowledge, expertise and technology to facilitate future in-house replication. Understanding and assessing the impacts of the developed innovative solutions to the society, in particular for the vulnerable societal groups, should be duly considered. Moreover, in addressing water allocation, the governance of water management and the efficiency of water use, especially for irrigation which is the largest water consumer, should be considered. Actions may also choose to address a combination of the above challenges at river basin scale and should capitalise on knowledge acquired in the projects supported by the joint coordinated EU-India call on water under FP7. 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 2016⁵⁹ 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 the Indian entities and thus Indian participants will not be eligible for EU funding. This call text will also be available on the websites of DST and DBT respectively and it will refer to the agreed Co-Funding Mechanism (CFM)⁶⁰ between the EC and DST and DBT. Proposals are to be developed jointly with the Indian entities. For funding purposes, the Indian entities must

⁵⁹ https://ec.europa.eu/commission/commissioners/2014-2019/vella/announcements/memorandum-understanding-between-republic-india-and-european-union-water-cooperation_en

⁶⁰ http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_india_en.pdf

submit the proposal to DST and/or DBT. Evaluation will be done jointly according to the conditions specified in the CFM and respecting the EC peer review rules.

The Commission considers that proposals requesting an overall contribution (including both EU and India funding) of between EUR 3 million and EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. The funding support for the Indian entities will be according to the DST and/or DBT funding guidelines.

Expected Impact: The project results are expected to contribute to:

- improved and efficient wastewater treatment systems, combined with recovery and reuse of energy, substances and treated water;
- improved novel drinking water purification technologies for safe drinking water with easy access at affordable cost both in rural and urban regions;
- improved smart and comprehensive solutions for both quality and quantity monitoring and management of water resources;
- strengthening the Sustainable Development Goals' (SDGs) agenda on water;
- boosting initiatives like the Ganga Rejuvenation Initiative⁶¹, fostering the emergence of quick-win business, affordable, innovative solutions based on integrated Indian and EU best practices;
- creating a level playing field for European and Indian industries and SMEs working in this area, paving the way for a potential joint venture for manufacturing of water treatment technologies and systems.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Innovating cities for sustainability and resilience

Most of the challenges Europe is facing today, such as climate change, water and waste management, health, social cohesion and immigration, have a strong urban dimension. However cities are also hubs of technological and social innovation, the places where capital investments, high productivity and high-skilled jobs are located. In this sense, cities not only contribute and are exposed to global challenges but they are also key players in providing solutions.

Actions in this part of the call have the medium-term objective of enabling cities to design and implement transition pathways to becoming inclusive, resilient, sustainable, low-carbon and resource efficient by enhancing their innovation capacity and enabling them to act as hubs of

⁶¹ <http://nmcg.nic.in/>

innovation. Further actions aim to strengthen the sustainability of urban areas globally, and particularly in China and CELAC countries. Ultimately, they are expected to support Europe's endeavours to implement the Sustainable Development Goals (SDGs), particularly SDG 11 'Sustainable cities and communities' and SDG 3 'Ensure healthy lives and promote well-being for all at all ages', together with the Habitat III New Urban Agenda, and the EU Urban Agenda⁶².

It should be noted that topic CE-SC5-03-2018 'Demonstrating systemic urban development for circular and regenerative cities' in this call also contributes to this priority.

Proposals are invited against the following topic(s):

SC5-13-2018-2019: Strengthening international cooperation on sustainable urbanisation: nature-based solutions for restoration and rehabilitation of urban ecosystems

Specific Challenge: Unsustainable, non-resilient urbanisation patterns, the expansion or neglect of urban areas have caused the fragmentation, depletion and destruction of habitats, biodiversity loss and the degradation of ecosystems and their services. Increasing connectivity between existing, modified and new ecosystems and restoring and rehabilitating them within cities and at the urban-rural interface through nature-based solutions⁶³, is necessary to enhance ecosystem resilience and adaptive capacity to cope with the effects of climate and global changes and to enable ecosystems to deliver their services for more liveable, healthier and resilient cities.

Scope: Actions should develop models, tools, decision support systems, methodologies, strategies, guidelines, standards and approaches for the design, construction, deployment and monitoring of nature-based solutions and restoration, prevention of further degradation, rehabilitation and maintenance measures for urban and peri-urban ecosystems and the ecological coherence and integrity of cities. Actions should review and capitalise upon existing experiences and good practices in Europe and (for option a) China or (for option b) CELAC. The strategies and tools should be part of an integrated and ecologically coherent urban planning and city-making process that would secure a fair and equitable distribution of benefits from the restored urban ecology and limit its exposure to environmental stresses. Methodologies, schemes and indicators should be developed to allow for the assessment of the cost-effectiveness of the restoration measures, also accounting for their possible negative effects. They should account for the totality of the benefits delivered by the restored ecosystems in terms of, for example, enhancing cities' climate-proofing and resilience, enhancing mitigation options, improving human health and well-being, reducing inequalities and reducing cities' environmental footprint. Actions should also dedicate efforts to awareness raising, outreach activities and education of citizens, including school children about the benefits of nature for their social, economic and cultural well-being.

⁶² <https://ec.europa.eu/futurium/en/urban-agenda>

⁶³ A definition is provided in the introductory text of this Work Programme

Actions should bring together European and – depending on the option chosen – Chinese or CELAC research partners, government agencies and urban authorities, private sector and civil society with relevant expertise and competence and foster participatory engagement in urban ecological restoration actions. Further to the eligibility and admissibility conditions applicable to this topic, proposals are encouraged to ensure, to the extent possible, an appropriate balance in terms of effort and/or number of partners between the EU and the international partners, which would correspond to their respective ambition, objectives and envisaged work. This would enhance the impact of the actions and the mutual benefits for both the EU and the international partners.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged. Proposals should pay attention to the special call conditions for this topic.

The participation of social sciences and humanities disciplines, addressing also the gender dimension, is crucial to properly address this topic. Cooperation and synergies with the activities undertaken within the Covenant of Mayors initiative for Climate and Energy⁶⁴ initiative (supported by the EC) should be sought where appropriate.

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

a) Strengthening EU-China collaboration (2018)

This topic is part of the EU-China flagship initiative on Environment and Sustainable Urbanisation which aims at promoting substantial coordinated and balanced research and innovation cooperation between the EU and China.

China-based participants have the possibility to apply for funding under the Chinese co-funding mechanism and other Chinese sources⁶⁵.

b) Strengthening EU-CELAC collaboration (2019)

The possibility for participants from some CELAC countries to apply for funding under national co-funding mechanism should be explored⁶⁶.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

⁶⁴ www.covenantofmayors.eu

⁶⁵ See http://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/international-cooperation_en.htm#support-non-eu-countries

⁶⁶ See http://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/international-cooperation_en.htm#support-non-eu-countries

- restored and functioning urban ecosystems with an enhanced capacity to deliver their services;
- making a business and investment case for nature-based solutions on the basis of increased evidence about the benefits from restored urban ecosystems with regards to urban liveability, climate change resilience, social inclusion, urban regeneration, public health and well-being;
- guidelines for cost effective urban ecosystem restoration and ecological rehabilitation measures and new planning approaches and methods.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

SC5-14-2019: Visionary and integrated solutions to improve well-being and health in cities

Specific Challenge: It is estimated that by 2050 up to 70% of the world's population will be living in urban areas. Urbanisation affects human health and well-being through factors such as exposure to pollutants, including noise, disasters, stressors and diseases, urban density, lack of physical activity, degraded ecosystems and erosion of natural capital, which can be exacerbated by climate change. As acknowledged by the Habitat III New Urban Agenda, public spaces play a crucial role in urban interaction and systemic urban innovation and they need to be designed and managed sustainably and equitably to ensure that the way citizens produce, consume, commute and interact within the urban fabric has a positive impact on their health and quality of life, enhances resilience to disasters and climate change and reduces the environmental footprint of the cities. The systemic integration of social, cultural, digital and nature-based innovation in the design, development and governance of public space has a tremendous potential to transform these spaces into diverse, accessible, safe, inclusive and high quality green areas that increase well-being and health and deliver a fair and equitable distribution of the associated benefits.

Scope: Actions should deliver visionary and integrated solutions (e.g. therapy gardens, urban living rooms, creative streets, city farms) at the intersection of social, cultural, digital and nature-based innovation to increase citizens' health and well-being in cities⁶⁷. These solutions should address social, cultural, economic and environmental determinants of health and well-being and support urban communities in reducing their exposure to climate-related risks, pollution (including noise), environmental stress and social tensions, including the negative effects of gentrification.

⁶⁷ For the purposes of this topic, the definition of a 'city' is to be understood according to the harmonised definition of a city established by the OECD and the European Commission, which can be found at: http://ec.europa.eu/regional_policy/sources/docgener/focus/2012_01_city.pdf

Actions should also demonstrate how the integration of these solutions into innovative land-use management, urban design and planning could reduce health-related environmental burdens in socially deprived neighbourhoods, foster equitable access for all to public spaces, enhance their quality and use and promote sustainable urban mobility patterns.

Actions should test new transition management approaches, governance models, legal frameworks and financing mechanisms to re-design public spaces and urban commons and assess their contribution to improving health and well-being. They should promote multi-stakeholder initiatives, citizens' engagement, co-creation and co-ownership of public spaces. Optimal and cost-effective use of behavioural games, networks of sensors, GIS-mapping, big data, observational programmes such as Copernicus and GEOSS, and citizens' observatories should be made as appropriate to enable the integration and visualisation of data for more effective monitoring of the transition towards healthier and happier cities.

The involvement of social sciences and humanities disciplines such as psychology, behavioural science, economics, law, anthropology, sociology, architecture, or design studies, is considered essential to enhance social learning and promote the role of social and cultural innovation in transforming public spaces, with particular attention devoted to gender dynamics and diversity.

To enhance the impact and promote upscaling and replication of these solutions, projects should engage in substantial networking and training actions to disseminate their experience, knowledge and deployment practices to other cities beyond the consortium. To enhance impact cooperation and synergies with the activities undertaken within the Global Covenant of Mayors for Climate and Energy initiative and its regional components⁶⁸ (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 relevant projects to be funded under topics SC5-20-2019 and CE-SC5-03-2018 of this Work Programme. Cooperation with relevant actions funded under the Horizon 2020 Societal challenge 6 topic 'TRANSFORMATIONS-03-2018-2019: Innovative solutions for inclusive and sustainable urban environments' should also be sought as appropriate.

Funded projects are expected to establish long-term sustainable data platforms securing open, consistent data about the impacts of the deployed approaches and ensure interoperability with other relevant data infrastructures for effective communication, public consultation, exchange of practices, and sharing of experiences.

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

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 10 million would allow this specific challenge to be addressed appropriately.

⁶⁸ EU Covenant of Mayors for Climate and Energy: www.covenantofmayors.eu; Global Covenant of Mayors for Climate and Energy: www.globalcovenantofmayors.org

Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- high quality, multifunctional, public spaces able to integrate digital, social, cultural and nature-based innovation to enhance health and well-being, while ensuring 'the right to the city' as specified in the Habitat III New Urban Agenda;
- European cities being world ambassadors of sustainable lifestyles, providing universal access to greener, safe, inclusive and accessible public spaces, also accounting for the gender dimension;
- participatory approaches in re-designing and transforming public spaces to increase health and well-being in cities through innovative public-private-people partnerships (PPPPs);
- more comprehensive assessment of the sustainability and resilience of cities through the development of health and well-being indicators;
- establishing innovative monitoring systems to measure benefits and capture the multiple co-benefits created by nature-based solutions in terms of health and well-being.

Type of Action: Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Protecting and leveraging the value of our natural and cultural assets: Earth observation

The Commission, together with the European GEO nations, is committed to implementing GEOSS in line with the new GEO Strategic Plan 2016-2025 and to developing an approach towards GEOSS for the European region (supporting the EuroGEOSS initiative of the European GEO caucus⁶⁹) that facilitates and steers national contributions while accelerating the use of GEOSS resources. At the same time, the capacity to observe the planet is evolving rapidly, leading to higher volumes of and more diverse data flows produced at European and national level by private and public operators (including from citizens).

Actions in this part of the call aim to capitalise on these trends, in collaboration with the Copernicus programme, to develop new mass-market applications for businesses, citizens and public authorities. Overall, actions are expected in the medium term to stimulate growth and jobs in Europe in the context of the digital economy (through open innovation) and to lead to better informed decision-making in environmental policy and management and in disaster

⁶⁹ For information on the European GEO caucus, please see the GEO High-Level Working Group at: http://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupDetail&groupID=1781&news=1&mod_groups=1&month=09&year=2017

management. Actions will also contribute to implementing EU space policy and to international agreements such as the 2030 Agenda for Sustainable Development, particularly Sustainable Development Goals (SDGs) 9 'Industry, innovation and infrastructure, 11 'Sustainable cities and communities', 13 'Climate action, 14 'Life below water' and 15 'Life on land'.

It should be noted that topics addressing Earth observation can also be found in other parts of the Horizon 2020 Work Programme 2018-2020, notably:

- in a dedicated part of the call 'Space 2018-2020' (H2020-SPACE-2018-2020) in the Work Programme part 'Leadership in Enabling and Industrial Technologies - Space'
- certain topics in the call 'Blue Growth' (H2020-BG-2018-2020) in the Work Programme part 'Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bioeconomy'
- the EIC Prize 'Early Warning for Epidemics' in the Work Programme part 'Towards the next EU Framework Programme for Research and Innovation: European Innovation Council (EIC) Pilot'.

Proposals are invited against the following topic(s):

SC5-15-2018: Strengthening the benefits for Europe of the Global Earth Observation System of Systems (GEOSS) - establishing 'EuroGEOSS'

Specific Challenge: In order to accelerate users' uptake of open Earth observation (EO) data and information for the benefit of Europe, there is a need to develop a coordinated and comprehensive EO data exploitation initiative within the larger GEOSS landscape. The challenge is to demonstrate the effective use of European EO resources (including space, airborne, in-situ measurements and citizen observations) to prepare for operational environmental forecasting, and for mitigation and adaptation actions through building on Copernicus services and GEOSS initiatives and flagships.

Scope: This action should be an application-oriented initiative, aimed at showcasing and promoting existing European 'GEOSS' actions and scaling them up to deliver services relying on existing strengths in Europe. The focus should be on a coordinated approach to promote collaboration amongst the GEO members and participating organisations within the European region. Based on the core use of a variety of data available within GEOSS, actions should scale up and develop a comprehensive suite of products, services or solutions delivering economic, social and policy value to European citizens, making use of state-of-the-art data integration and fusion techniques. This work should be performed in close collaboration with the European EO programme Copernicus and be in compliance with the INSPIRE Directive, and build on the European GEOSS Data Hub currently developed through the Horizon 2020 project NextGEOSS..

'EuroGEOSS' should also facilitate the access to and integration of untapped national in-situ Earth observation data with research-based data and different sources such as Copernicus, the

European research infrastructures, citizen science initiatives and others, into user oriented applications. EuroGEOSS should focus on delivering information for the achievement of the 2030 Agenda for Sustainable Development and other GEO engagement priorities in a European context. 'EuroGEOSS' should further advance the GEOSS data sharing and Data Management Principles across Europe.

A plan for longer term sustainability (beyond the life of the project) of the applications developed through the 'EuroGEOSS' action should be elaborated in close coordination with the EuroGEOSS initiative of the European GEO caucus.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 15 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- delivering economic, social and policy value to European citizens through a comprehensive and coordinated suite of services;
- a strengthened Earth observation capacity focused on the European region;
- the strengthening and promotion of links between GEOSS and Copernicus, showcasing mutual benefits. This also includes European national contributions to and benefits from GEOSS;
- the coordinated downstream data exploitation of European EO datasets available through the GEOSS (such as Copernicus data sets, data sets from the different European research infrastructures, citizen science initiatives, and national databases of in-situ observations).
- coherent data management, through the use of GEOSS Data Management Principles and best practices (INSPIRE-compliant);
- significant advances in Earth System Science modelling and downstream product development;
- capacity building among current and potential users.

Type of Action: Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

SC5-16-2019: Development of commercial activities and services through the use of GEOSS and Copernicus data

Specific Challenge: Both GEOSS (Global Earth Observation System of Systems) and its key European contributor, Copernicus, offer a tremendous innovation opportunity for the EU in

the domain of Earth Observation (EO) as these initiatives enable long term access to a broad range of EO datasets, opening new avenues for the delivery of innovative environmental products and services. These data sources provide new opportunities for business sectors in Europe to deliver information and products that are vital inputs to help decision makers, industry and citizens adapt to changes occurring at different paces and affecting the Earth systems. The challenge faced today is to move from stand-alone observation data supply activities to more downstream integrated information services addressing citizens' needs directly within the context of their day-to-day lives.

However, those opportunities for the development of a new market of EO services and products cannot be fully exploited without a stronger involvement of commercial sector actors in both the GEO and Copernicus initiatives.

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

a) Coordination of European innovators in the domain of Earth observation (Coordination and Support Action): Actions should foster the development and implementation of a collaborative and integrated European research and innovation strategy for mass market applications based on space and non-space Earth observation. The action will support an industry-led stakeholder research and innovation forum in the domain of Earth observation in close collaboration with GEO and Copernicus, driving for innovation, knowledge transfer and European competitiveness.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 1 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

b) Designing Earth observation services and products of the future, building on GEOSS and Copernicus assets (Innovation Action): Actions should deliver solutions addressing citizens' needs and contributing to the development of new markets of products and services through integrating Earth observation (EO) data and information, e.g. from GEOSS and Copernicus, with other data sources. These products and services should incorporate assimilation techniques and interoperability best practices, automation, systemization and integrated web-based services, and be brought – at least – into pre-operational service provision, going beyond the demonstration phase. Activities are expected to focus on Technology Readiness Levels (TRLs) 5 to 7.

The Commission considers that proposals requesting a contribution from the EU from between EUR 2 million and EUR 3 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- effective engagement of the European commercial sector within GEOSS;

- new commercial products and services using GEOSS and Copernicus data and services;
- capacity building among current and potential developers of commercial products;
- demonstrated capability and reliability of novel EO products and services through the whole value chain;
- mobilising the most dynamic actors of the European commercial sector, developing new EO-derived mass markets and increasing cross-domain exploitation of EO data.

Type of Action: Coordination and support action, Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Protecting and leveraging the value of our natural and cultural assets: Nature-based solutions, disaster risk reduction and natural capital accounting

Predicting earthquakes reliably and enhancing early warning capacity prior to an earthquake would enable the timely rolling out of emergency plans and actions and prevent the loss of human lives. Similarly, mainstreaming the actual value of nature into our economic transactions would foster a wiser use and management of our natural capital and sustained biodiversity and ecosystems' productive capacity for our benefit but also for the benefit of the future generations. Actions under this section will help create economic, social and environmental resilience in our societies.

Actions under this section of the call aim to improve decision making, early warning, preparedness and communication among relevant actors to better cope with earthquakes through enhanced forecasting capacity. Furthermore, they aim to enhance the capacity of authorities and the private sector to better assess and value biodiversity, ecosystems and their services to enable them to incorporate and mainstream these values into their accounting and decision making frameworks. Ultimately, they are expected to support Europe's endeavours to implement the Sustainable Development Goals (SDGs), particularly SDG 3 'Ensure healthy lives and promote well-being for all at all ages', SDG 6 'Ensure availability and sustainable management of water and sanitation for all', SDG 8 'Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all', SDG 11 'Make cities and human settlements inclusive, safe, resilient and sustainable', SDG 13 'Take urgent action to combat climate change and its impacts' and SDG 15 'Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss'.

It should be noted that topic LC-CLA-06-2019 'Inter-relations between climate change, biodiversity and ecosystem services' in the call 'Building a low-carbon, climate resilient future: climate action in support of the Paris Agreement' also contributes to this priority.

Proposals are invited against the following topic(s):

SC5-17-2018: Towards operational forecasting of earthquakes and early warning capacity for more resilient societies

Specific Challenge: To help mitigate the risks related to earthquakes, citizens need additional protection that goes beyond building codes and retrofitting actions. Early warning approaches and operational earthquake forecasting, which are under development, need to be seen in a Europe-wide perspective, building on improved, dense, robust and high quality seismic networks and new processing tools and activities. The practical applications and use of short-term forecasting, early warning methods, time dependent physical and systemic vulnerability estimates and rapid loss assessment for earthquake risk reduction are still far from being operational. Strong European and international scientific collaboration is needed to make substantial progress in the domain.

Scope: Actions should enable an effective, real time seismic risk reduction capacity, and the improvement of current observational capabilities, present forecasting modelling and testing-validation capabilities, also accounting for their uncertainties. They should also enable the designing of clear procedures and improved decision making schemes to respond to stakeholders' needs. Actions should also suggest how to move from a single, probabilistic hazard forecasting model to complex, short-term risk forecasting models. Research should focus on better understanding which conditions may lead to an increased likelihood of earthquakes and/or which transient geophysical properties should be monitored as precursors before a large magnitude and damaging earthquake.

Building on multi-disciplinary research, actions should develop a new generation of early warning systems to mitigate the impact of earthquakes on societies and infrastructures, integrating innovative concepts and technologies, such as low-cost wireless seismic sensors and big data, for more accurate and reliable quantification of ground shaking (during or soon after the earthquake occurrence). These new early warning systems should also include decisional expert systems and should combine local and regional information, including social and economic data. They should have the capacity to trigger automatic safety actions or reach people before ground shaking occurs to mitigate the human and economic impact of earthquakes. They should also contribute to the development of future multi-hazard early warning systems.

Furthermore, actions should develop effective methods and communication systems and structures to improve dialogue between science and relevant users within the decision making chain. Actions should capitalise on knowledge acquired in previous and ongoing initiatives such as GEO Supersites/observational network, EPOS (European Plate Observing System), ARISTOTLE (All Risk Integrated System TOwards Trans-boundary hoListic Early-warning) and the Copernicus Emergency Management Service, and ensure compatibility and appropriate liaising with these initiatives.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged⁷⁰.

The Commission considers that proposals requesting a contribution from the EU of between EUR 6 million and EUR 8 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- improved real time seismology and seismic risk reduction capacity;
- improved short-term forecasting, real-time operational forecasting and fast, reliable alerts and information;
- development of sound and rational risk reduction plans to manage low-probability/high-impact events;
- improved preparedness due to more effective two-way communication on forecasts, early warning and uncertainties for users and the public;
- improved capacity to tangibly reduce human and economic losses.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

SC5-18-2018: Valuing nature: mainstreaming natural capital in policies and in business decision-making⁷¹

Specific Challenge: A broad range of economic activities are dependent upon natural capital, but natural assets are not unlimited. However, many ecosystem services and benefits to society and business, such as food provision, air and water filtration, disaster risk reduction, pollination, or climate regulation, are not visible because they are not priced on markets and hence not currently accounted for in socio-economic decision-making. Incorporating natural capital – and especially ecosystems – into national accounting systems as well as policy and business practices is needed to promote more resource efficient and sustainable choices, and to support smart, sustainable and inclusive growth.

Further to the work and progress at international level, important results have been achieved at European level under the initiative on Mapping and Assessment of Ecosystems and Services (MAES)⁷², as well as on categorising ecosystem services through the Common

⁷⁰ e.g. with USA, New Zealand, Japan, Chile, Mexico

⁷¹ This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to EASME and will be implemented by the Commission services.

⁷² http://ec.europa.eu/environment/nature/knowledge/ecosystem_assessment/index_en.htm

International Classification of Ecosystem Services (CICES). In addition, the KIP-INCA project⁷³ aims to design and implement an integrated accounting system for ecosystems and their services in the EU. KIP-INCA aims to develop a comprehensive set of European-level natural capital accounts.

In addition, all businesses impact and depend on natural capital to some extent. The Natural Capital Protocol (NCP)⁷⁴ has been published as a framework to help generate robust and actionable information for business managers to inform decisions. National and corporate accounting is still in early phases of development and long-term coherence between these two strands of work is needed.

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 recommendations⁷⁵ and the methodological work and guidance of KIP-INCA⁷⁶.

Actions 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

⁷³ http://ec.europa.eu/environment/nature/capital_accounting/index_en.htm

⁷⁴ <http://naturalcapitalcoalition.org/protocol/>

⁷⁵ https://unstats.un.org/UNSD/envaccounting/eea_project/default.asp

⁷⁶ In particular, the report on Phase 1 of KIP-INCA: http://ec.europa.eu/environment/nature/capital_accounting/pdf/KIP_INCA_final_report_phase-1.pdf. For an up-to-date list of KIP-INCA methodological and guidance documents please refer to: http://ec.europa.eu/environment/nature/capital_accounting/index_en.htm.

National Statistical Offices or other statistical authorities⁷⁷, is strongly encouraged for the success of this action.

Actions should exploit the experience of KIP-INCA partners⁷⁸ and the ongoing work of MAES.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 3 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

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 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 incentivise 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.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- mainstreaming natural capital and ecosystem services accounts at appropriate administrative or corporate levels;

⁷⁷ http://ec.europa.eu/eurostat/documents/747709/753176/List_ONAs_FR_14092016/4b8becf5-5923-46c3-a208-4423830aaf87

⁷⁸ The European Environment Agency (EEA) that has piloted land and water accounts; the JRC and its experience on modelling ecosystem services; FP7 and Horizon 2020 projects, such as OPERAs (<http://operas-project.eu>), OpenNESS (<http://www.openness-project.eu/>), ESMERALDA(<http://esmeralda-project.eu/>); SWOS (<http://swos-service.eu/>) or ECOPOTENTIAL (www.ecopotential-project.eu); and DG Environment (DG ENV) on policy orientations, implications and take-up

- decision-makers acknowledging the macro-economic and the micro-economic perspective of natural capital;
- recognition of the value of natural capital and ecosystem services accounts, attracting private and public funding for further adoption;
- the acknowledgment, operationalising and mainstreaming of, and accounting for, natural capital, including nature-based solutions, and its wider value in public authorities and companies' decision making frameworks and business models.

Type of Action: Coordination and support action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Protecting and leveraging the value of our natural and cultural assets: Heritage alive

Cultural heritage is a non-renewable, irreplaceable resource and a common good, but is frequently under threat from environmental challenges and climate change, disaster risks, neglect, decay and under-funding. It can play a crucial and catalytic role in well-being, cultural diversity, sustainable development and social cohesion and as such it needs to be protected and preserved through leveraging its innovation potential.

Actions in this part of the call have the medium-term objective of positioning cultural heritage at the centre of sustainable development and unlocking its potential as a strategic living resource and driver for economic growth and job creation, social cohesion and environmental sustainability. By doing so, they will also contribute to the protection and preservation of cultural and historic heritage in Europe and beyond and will mobilise investments in the sector leading to the emergence of a global market for heritage-led innovative solutions and services. Ultimately, they are expected to support Europe's endeavours to implement the Sustainable Development Goals (SDGs), particularly SDG 11 'Sustainable cities and communities' and its target of strengthening efforts to protect and safeguard the world's cultural and natural heritage.

It should be noted that topic 'LC-CLA-04-2018: Resilience and sustainable reconstruction of historic areas to cope with climate change and hazard events' in the call 'Building a low-carbon, climate resilient future: climate action in support of the Paris Agreement' also contributes to this priority.

Proposals are invited against the following topic(s):

SC5-19-2018: International network to promote cultural heritage innovation and diplomacy⁷⁹

Specific Challenge: Over the years, Europe has developed world-renowned knowledge, expertise, practices, skills and technologies to protect, conserve, manage, enhance and leverage value from its rich and diverse cultural heritage. Cultural heritage not only provides people with a sense of identity and belonging, it also brings a large innovation potential to a number of economic sectors such as tourism, cultural industries, urban planning, regional planning, arts and design. It can also contribute to improving the EU's relations with other regions. Nevertheless, in some countries cultural heritage is still an underestimated resource and/or is at risk or under threat for various reasons (e.g. lack of awareness, economic crisis, conflicts, natural and anthropogenic hazards, mass tourism, etc.).

Scope: Actions should establish an international network that will capitalise on EU expertise to leverage the value of European cultural heritage assets, promote heritage-led innovation for sustainable development and provide expertise and assistance, particularly where cultural heritage is at risk. The network should include researchers, policy-makers, businesses (including SMEs), societal and cultural institutions, including NGOs and CSOs, public and private organisations, investors, experts, innovators and citizens. Through a process of continuous dialogue, interaction and sharing of experiences, including with appropriate UN agencies, the network should:

- identify, review, document and promote successful heritage-led initiatives, knowledge, innovative solutions, new governance, finance and business models, innovative regulative frameworks, tools, technologies (e.g. Earth observation data – EU Copernicus, drones, satellite navigation and positioning, nanomaterials, ICT etc.) and approaches for monitoring, protecting, preserving and managing cultural heritage, and promoting its innovation potential for sustainable development, especially where cultural heritage is at risk; to further capitalize on the works of the 2018 European Year of Cultural Heritage, the network should explore possibilities for further pursuance of the innovation relevant outcomes generated during this year;
- identify specific domains and priorities where further research and innovation is needed, accounting also for the gender dimension;
- analyse potential regulatory, economic, social and technical barriers and propose concrete ways to overcome them at the EU and international levels;
- develop guidelines, tools and methodologies to leverage cultural heritage potential for diplomacy to improve EU relations with other parts of the world;
- conduct capacity building to foster collective management, responsibility and ownership of heritage and awareness raising activities among public authorities, stakeholders and

⁷⁹ This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders and the promotion of coherent and effective cooperation with third countries is excluded from the delegation to EASME and will be implemented by the Commission services.

society, particularly in countries where heritage is at risk, about the potential of cultural heritage as an investment opportunity with multiple benefits for the economy, society and the environment, rather than as a cost factor.

The network should involve institutions, organisations and relevant stakeholders from a broad range of EU Member States and Associated countries. In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged, in particular with EU Neighbourhood countries and with countries in which cultural heritage assets are under threat.

The network should envisage resources for clustering with other projects relevant to cultural heritage funded under previous, current and future Horizon 2020 calls within Societal Challenge 5 in order to take due account of their outcomes. It should also create synergies with other relevant ongoing initiatives such as the JPI Cultural Heritage.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 2.5 million to EUR 3 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- more extensive protection and preservation of cultural heritage, and optimal use of its innovation potential for sustainable development;
- the emergence of a global market for heritage-led sustainable innovation, through EU-wide evidence and increased awareness among investors, practitioners and the public;
- enhanced capacity of third countries to manage, enhance and safeguard cultural heritage, particularly where it is at risk, through provision of EU knowhow and assistance;
- improved cross-fertilisation between the corresponding EU and UN policies and actions relevant to cultural heritage;
- increased support to the new EU Strategy for International Cultural Relations and more effective EU external relations through cultural heritage diplomacy.

Type of Action: Coordination and support action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

SC5-20-2019: Transforming historic urban areas and/or cultural landscapes into hubs of entrepreneurship and social and cultural integration

Specific Challenge: Over the past decades, abandonment and decay of urban, industrial and rural heritage has occurred in many historic urban areas⁸⁰ and cultural landscapes⁸¹ due to reduction of economic activities and closing down of industries. This has led to unemployment, disengagement and economic stagnation. Other areas, in contrast, have implemented regeneration processes, yet these have not always been successful as they were based on top-down decision making and implementation without engaging the local population. This has led to breaking up of traditional social structures, gentrification and over-reliance on volatile sectors, such as tourism.

Thanks to their symbolic and cultural value, and to their specific urban fabric, historic areas have the potential to be transformed into hubs of entrepreneurship, creativity⁸², innovation, new lifestyles, and social and cultural integration reaping the opportunities offered by, for instance, emerging creative sectors, digital technologies, the sharing and 'maker' economy, and social innovation. Evidence-based intelligent leveraging of the value of historic and cultural assets can transform challenges into economic, social and cultural opportunities, while fully respecting the identity of the historic urban areas and cultural landscapes.

Scope: Actions should develop, demonstrate and document strategies, approaches and solutions to re-activate and re-generate historic urban areas⁸³ and/or cultural landscapes⁸⁴. They should foster innovation by relevant start-ups, cultural and creative industries, including from the digital technologies sector, small scale advanced manufacturing producers and local 'makers', craft workshops, etc. for adaptive re-use and leverage of heritage assets and social integration. Solutions should be co-created, co-managed and co-implemented at the appropriate scale (e.g. for districts, buildings, public spaces etc.) within the broader context of urban and regional development, and involving local populations, research centres, appropriate authorities, innovators, universities, city-makers movements and, where relevant, new population groups. Systemic approaches and methodologies to identify the latent capacities of historic urban areas and to activate them may be developed. They should assess cultural and heritage values, respect the identity of the places and promote social innovation, also accounting for the gender dimension, economic sustainability, inclusiveness, social cohesion and integration in the long term. Innovation in its various forms (e.g. regulatory, governance, business, finance) should be considered. Synergies with other ongoing relevant projects, such as the European Creative Hubs Network⁸⁵, should be sought where appropriate.

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

⁸⁰ For a definition, see http://portal.unesco.org/en/ev.php-URL_ID=48857&URL_DO=DO_TOPIC&URL_SECTION=201.html

⁸¹ For a definition, see the European Landscape Convention - ELC (2001), <http://www.coe.int/en/web/landscape>

⁸² Building on the EU-funded European Creative Hubs Network: <http://creativehubs.eu/>

⁸³ For a definition, see http://portal.unesco.org/en/ev.php-URL_ID=48857&URL_DO=DO_TOPIC&URL_SECTION=201.html

⁸⁴ For a definition, see the European Landscape Convention - ELC (2001), <http://www.coe.int/en/web/landscape>

⁸⁵ <http://creativehubs.eu/about-european-creative-hubs-network/>

Actions should envisage resources for clustering with other ongoing and future projects relevant to cultural heritage funded under previous, current and future Horizon 2020 calls within Societal Challenge 5 as well as with relevant projects to be funded under topics CE-SC5-03-2018 and SC5-14-2019.

The Commission considers that proposals requesting a contribution from the EU of between EUR 7 million and EUR 8 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: The project results are expected to contribute to:

- reversing trends of abandonment and neglect of historic heritage in urban areas and landscapes;
- new and tested blueprints for the socially and economically viable regeneration of European historic urban areas and cultural landscapes, with enhanced well-being and quality of life, social cohesion and integration;
- boosting heritage and culture-relevant innovation, creativity, entrepreneurship and light 'reindustrialisation' of historic urban areas and cultural landscapes;
- cross-sector collaboration, creation of job opportunities and skills in cultural and creative sectors and innovative manufacturing linked to historic heritage.

Type of Action: Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Proposals are invited against the following topic(s):

SC5-21-2019-2020: ERA-NET Cofund action(s) for climate action, environment, resource efficiency and raw materials⁸⁶

Specific Challenge: While Europe is making progress in reducing environmental pressures and addressing climate change challenges, current environmental policies and technology efficiency gains are not likely to be sufficient to address the substantial challenges it faces in protecting its natural capital, stimulating resource-efficient, low-carbon and climate-resilient economic and social development and safeguarding its population from environmental health risks⁸⁷. The challenge of underpinning and accelerating the transformation of our economy and society to achieve more sustainable development paths has a planetary scale. The UN's 2030 Agenda for Sustainable Development and the Paris Agreement on climate change have given new impetus to tackling these challenges at a global level.

⁸⁶ It is expected that this topic will continue in 2020.

⁸⁷ See the European Environment Agency's 2015 State of the Environment Report <http://www.eea.europa.eu/soer#tab-synthesis-report>

Operating a systemic transformation for sustainable development requires the mobilisation of all relevant actors: public authorities at various levels, manufacturing industry and business at large, academia, research institutes, finance and insurance, non-governmental organisations and civil society. A properly aligned European Research Area, which is also open to the world, can make an essential difference in enabling a transformative sustainability agenda to take shape. The alignment of research and innovation agendas is therefore crucial in bringing about the necessary transformations.

Scope: 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.

Actions should focus on one of the following issues: 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; biodiversity and climate change; conservation and restoration of degraded ecosystems and their biodiversity, including a focus on aquatic systems; enhancing urban transformation capacities/circular cities; sustainable supply of raw materials; next generation of climate science in Europe.

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.

Expected Impact: The project results are expected to contribute to:

- effective trans-national, pan-European research networking and synergies among national/regional and EU research programmes in the areas addressed;
- new knowledge-intensive products and services;
- improved evidence-based policy through the interdisciplinary and trans-disciplinary science-policy interface and links with international efforts and fora on the areas addressed.

Type of Action: ERA-NET Cofund

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Indicative topics for 2020

- Connecting economic and environmental gains - the circular economy

CE-SC5-22-2020: Improving the recovery and recycling of materials from composite and multi-layer products

CE-SC5-23-2020: Understanding the transition to circular economy and its implications

- Raw materials

CE-SC5-07-2020: Raw materials innovation for the circular economy

CE-SC5-08-2020: Raw materials policy support actions for the circular economy: expert network on Critical Raw Materials

Conditions for the Call - Greening the economy in line with the Sustainable Development Goals (SDGs)

Opening date(s), deadline(s), indicative budget(s):⁸⁸

| Topics (Type of Action) | Budgets (EUR million) | | | Deadlines |
|--|-----------------------|------|------|---------------------------|
| | 2018 | 2019 | 2020 | |
| Opening: 07 Nov 2017 | | | | |
| CE-SC5-05-2018 (CSA) | 2.00 | | | 27 Feb 2018 |
| CE-SC5-08-2018-2019-2020 (CSA) | 5.00 | | | |
| SC5-12-2018 (RIA) | 15.00 | | | |
| SC5-18-2018 (CSA) SC5-19-2018 (CSA) | 7.70 | | | |
| CE-SC5-01-2018 (RIA) | 34.00 | | | 27 Feb 2018 (First Stage) |

⁸⁸ The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.

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

All deadlines are at 17.00.00 Brussels local time.

The deadline(s) in 2019 and 2020 are indicative and subject to separate financing decisions for 2019 and 2020.

The budget amounts for the 2018 budget are subject to the availability of the appropriations provided for in the draft budget for 2018 after the adoption of the budget 2018 by the budgetary authority or, if the budget is not adopted, as provided for in the system of provisional twelfths.

The budget amounts for the 2019 and 2020 budget are indicative and will be subject to separate financing decisions to cover the amounts to be allocated for 2019 and for 2020.

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|-----------------------------------|--------|--------|-------|----------------------------|
| CE-SC5-02-2018 (RIA) | 5.00 | | | 04 Sep 2018 (Second Stage) |
| CE-SC5-03-2018 (IA) | 39.00 | | | |
| CE-SC5-06-2018 (RIA) | 15.00 | | | |
| CE-SC5-07-2018-2019-2020 (IA) | 20.00 | | | |
| SC5-09-2018-2019 (RIA) | 20.00 | | | |
| SC5-11-2018 (IA) | 14.00 | | | |
| SC5-13-2018-2019 (RIA) | 10.00 | | | |
| SC5-15-2018 (IA) | 15.00 | | | |
| SC5-17-2018 (RIA) | 18.00 | | | |
| Opening: 14 Nov 2018 | | | | |
| CE-SC5-08-2018-2019-2020 (CSA) | | 3.00 | | 19 Feb 2019 |
| SC5-16-2019 (CSA) | | 1.00 | | |
| SC5-21-2019-2020 (ERA-NET-Cofund) | | 10.00 | | |
| CE-SC5-04-2019 (IA) | | 72.00 | | 19 Feb 2019 (First Stage) |
| CE-SC5-07-2018-2019-2020 (IA) | | 30.00 | | 04 Sep 2019 (Second Stage) |
| SC5-09-2018-2019 (RIA) | | 30.00 | | |
| SC5-10-2019-2020 (IA) | | 20.00 | | |
| SC5-13-2018-2019 (RIA) | | 10.00 | | |
| SC5-14-2019 (IA) | | 43.00 | | |
| SC5-16-2019 (IA) | | 15.00 | | |
| SC5-20-2019 (IA) | | 25.00 | | |
| Opening: To be defined | | | | |
| Focus area topic(s) for 2020 | | | 81.00 | To be defined |
| Overall indicative budget | 219.70 | 259.00 | 81.00 | |

Indicative timetable for evaluation and grant agreement signature:

For single stage procedure:

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- Information on the outcome of the evaluation: Maximum 5 months from the final date for submission; and
- Indicative date for the signing of grant agreements: Maximum 8 months from the final date for submission.

For two stage procedure:

- Information on the outcome of the evaluation: Maximum 3 months from the final date for submission for the first stage and maximum 5 months from the final date for submission for the second stage; and
- Indicative date for the signing of grant agreements: Maximum 8 months from the final date for submission of the second stage.

Eligibility and admissibility conditions: The conditions are described in General Annexes B and C of the work programme. The following exceptions apply:

| | |
|--------------------------|---|
| CE-SC5-03-2018 | To ensure coverage of geographic, socio-economic and cultural diversity across the EU, consortia must comprise at least 4 cities from different Member States or Associated Countries that are committed to implement the proposed innovative actions/schemes during the project and to assess their impacts and cost-efficiency in enhancing the circular and regenerative capacity of the cities. |
| CE-SC5-08-2018-2019-2020 | In addition to the minimum number of participants set out in the General Annexes, proposals addressing sub-topic c) shall include at least one participant from third countries. |
| SC5-12-2018 | Due to the specific challenge of this topic, in addition to the minimum number of participants set out in the General Annexes, proposals shall include at least three participants from India. |
| SC5-13-2018-2019 | In addition to the minimum number of participants set out in the General Annexes, proposals addressing sub-topic a) shall include at least three participants from China and proposals addressing sub-topic b) shall include at least three participants from CELAC (Community of Latin American and Caribbean States) countries. |
| SC5-14-2019 | To ensure coverage of geographic, socio-economic and cultural diversity across the EU, consortia must comprise at least 4 cities from different Member States or Associated Countries that are committed to implement the proposed innovative solutions during the project and to assess their impacts and cost-efficiency |

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| | in improving health and well-being in the cities. |
| SC5-20-2019 | To ensure geographic, socio-economic and cultural diversity coverage across Europe, consortia must include at least 4 historic areas and/or cultural landscapes from different Member States or Associated Countries that are committed to implement and assess the proposed schemes during the project for transforming them into hubs of entrepreneurship and social and cultural integration. |

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in General Annex H of the work programme.

Evaluation Procedure: The procedure for setting a priority order for proposals with the same score is given in General Annex H of the work programme. The following exceptions apply:

| | |
|--------------------------|--|
| CE-SC5-08-2018-2019-2020 | Grants will be awarded to proposals according to the ranking list. However, in order to ensure a balanced portfolio of supported actions, at least the highest-ranked proposal per sub-topic will be funded provided that it attains all thresholds. |
| SC5-18-2018, SC5-19-2018 | Grants will be awarded to proposals according to the ranking list. However, in order to ensure a balanced portfolio of supported actions, at least the highest-ranked proposal per (sub-)topic will be funded provided that it attains all thresholds. |

The full evaluation procedure is described in the relevant [guide](#) published on the Participant Portal.

Grant Conditions:

| | |
|----------------|---|
| CE-SC5-03-2018 | As an exception from General Annex D for grants awarded under this topic and type of action, funding rate of construction and installation of “infrastructure-targeted” interventions is 20% of the eligible costs. Beneficiaries’ own resources and/or mobilisation and leverage of additional investments beyond Horizon 2020, whether private or public, should make up the remaining investment costs and should secure economic and financial sustainability for the execution of the project. |
| SC5-14-2019 | As an exception from General Annex D for grants awarded under this topic and type of action, funding rate of construction and installation of the nature-based solutions and other infrastructure-targeted investments is 20% of the eligible costs. |

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| | |
|--|---|
| | Beneficiaries' own resources and/or mobilisation and leverage of additional investments beyond Horizon 2020, whether private or public, should make up the remaining investment costs and should secure economic and financial sustainability for the execution of the project. |
|--|---|

Consortium agreement:

| | |
|---|--|
| CE-SC5-01-2018, CE-SC5-02-2018, CE-SC5-03-2018, CE-SC5-04-2019, CE-SC5-05-2018, CE-SC5-06-2018, CE-SC5-07-2018-2019-2020, CE-SC5-08-2018-2019-2020, SC5-09-2018-2019, SC5-10-2019-2020, SC5-11-2018, SC5-12-2018, SC5-13-2018-2019, SC5-14-2019, SC5-15-2018, SC5-16-2019, SC5-17-2018, SC5-18-2018, SC5-19-2018, SC5-20-2019, SC5-21-2019-2020 | Members of consortium are required to conclude a consortium agreement, in principle prior to the signature of the grant agreement. |
|---|--|

SME instrument & Fast-Track-to-Innovation

The respective calls for the EIC-SME instrument call (H2020-EIC-SMEInst-2018-2020) and EIC-Fast-Track-to-Innovation (H2020-EIC-FTI-2018-2020) are found under the Horizon 2020 Work Programme Part – ***Towards the next EU Framework Programme for Research and Innovation: European Innovation Council (EIC) Pilot*** (part 17 of this work programme).

Other actions⁸⁹

1. External expertise

This action will support the use of appointed independent experts for the monitoring of actions (grant agreement, grant decision, procurements, financial instruments).

Type of Action: Expert Contracts

Indicative budget: EUR 0.25 million from the 2018 budget and EUR 0.25 million from the 2019 budget

2. High Level Expert Group for SRIA on innovating cities

Cities are the home of complex, inter-dependent challenges related to resource depletion, climate change impacts, environmental degradation, pollution, health issues and social exclusion. The role of cities as key actors and incubators for innovative solutions that tackle these challenges has been acknowledged by many international policy for a such as the COP21 Paris Agreement, the UN's Sustainable Development Goals (SDGs), the Sendai framework for Disaster Risk Reduction, the Energy Union Strategy 2030 and the new Urban Agendas worldwide and for the EU.

Research and innovation has been recognized as a crucial to enable cities to design and implement their transition pathways to become inclusive, resilient, sustainable, low-carbon and resource efficient and contribute to meeting the targets set out by the above mentioned policy fora.

Building on the success and momentum created by the first calls (2017-2018) on “Smart and Sustainable Cities” and in the light of the new political frameworks, a high level experts group will be set up to assist the Commission in the formulation of a new, forward-looking and visionary strategic R&I agenda (SRIA) that would enhance the innovation capacity of the cities and foster a more systemic and cross-sectorial ‘urban ecosystem’ framework to address the urban challenges.

The SRIA should provide scope, ambition and opportunities for mobilizing the scientific community, urban authorities, the private sector, relevant stakeholders, investors, NGOs and the society at large and aligning them towards the development of systemic, integrated and cross-sectorial approaches and solutions encapsulating technological, social (also including the gender dimension), digital and nature-based innovation.

⁸⁹ The budget amounts for the 2018 budget are subject to the availability of the appropriations provided for in the draft budget for 2018 after the adoption of the budget 2018 by the budgetary authority or, if the budget is not adopted, as provided for in the system of provisional twelfths.

The budget amounts for the 2019 and 2020 budget are indicative and will be subject to separate financing decisions to cover the amounts to be allocated for 2019 and for 2020.

The SRIA should focus on resilience, foster new and disruptive technologies and business models that break sectoral (e.g. energy, transport, ICT, environment, institutional, governance, economic and cultural) silos, facilitate social innovation, participatory decision making and engagement, collaborative practices (also from a gender perspective) and equitable distribution of costs and benefits likely to incur during the transition and necessary for the adaptation to current and evolving challenges. Developments and findings from the R&I actions should make a quantifiable impact regarding the promotion of green and low-carbon economic development, better regulations, enhance resilience, sustainability, health and well-being, more inclusive and cohesive societies, safety, equity and easier access to infrastructures and better services for all.

The Commission will use the final output of this panel as one of the sources of inspiration for setting up priorities for the next Framework Programme.

The activities carried out by the group will be essential to the development and monitoring of the Union policy on Research, technological development and demonstration.

The experts will be highly qualified and specialised, selected on the basis of objective criteria, following a call for applications published in accordance with Article 10 of Decision C(2016)3301. A special allowance of EUR 450/day for each full working day spent assisting the Commission in terms of Article 21 of Decision C(2016)3301 will be paid to the experts appointed in their personal capacity who act independently and in the public interest. This amount is considered to be proportionate to the specific tasks to be assigned to the experts, including the number of meetings to be attended and possible preparatory work.

Type of Action: Expert Contracts

Indicative timetable: 1st Quarter of 2018

Indicative budget: EUR 0.15 million from the 2018 budget

3. GEO subscription

An annual contribution to the 2018 and 2019 activities of the GEO Secretariat, as subscription to a body of which they are a member, according to Article 121(2)(d) of the Financial Regulation applicable to the general budget of the European Communities.

As a full member of GEO the Commission will pay a contribution on behalf of the EU to the GEO Trust Fund, which is the budgetary structure agreed by the GEO members to fund the GEO secretariat (hosted by the World Meteorological Organisation in Geneva, Switzerland), to ensure the implementation of the Global Earth Observation System of Systems (GEOSS) according to its annual work plan and the continuity of the leadership and participation of the EU in GEO.

Type of Action: Subscription

Indicative timetable: Second Quarter of 2018 and second Quarter of 2019

Indicative budget: EUR 1.00 million from the 2018 budget and EUR 1.00 million from the 2019 budget

4. Support actions for raw materials policy (public procurement) ⁹⁰

The secretariat supporting the implementation of the European Innovation Partnership (EIP) on Raw Materials.

This action will ensure constant and high quality support to the European Innovation Partnership (EIP) on Raw Materials. Particularly, it will provide secretariat services to handle the different EIP groups (i.e. High-level Steering Group and Sherpa Group and the meetings of Operational Groups) by ensuring:

- the EIP daily logistics,
- the logistics of the EIP meetings (EIP groups and High Level Annual Conference),
- minutes taking,
- communication and visibility activities (e.g. EIP website moderation and content update, social network contributions, EIP newsletter).

The secretariat will be the contact point for stakeholders.

Number of contracts: one

Indicative duration of the contracts: 12 months, with possibility of renewal for a further 12-month period

Type of Action: Public Procurement - direct contract

Indicative timetable: 4th Quarter of 2018 and 4th Quarter of 2019

Indicative budget: EUR 0.60 million from the 2018 budget and EUR 0.60 million from the 2019 budget

5. Other support actions for raw materials and circular economy policy (public procurement) ⁹¹

Technical assistance supporting the implementation of raw materials-related actions included in the Circular Economy Action Plan of the European Commission (COM(2015) 614), in particular in relation to European standardisation work.

⁹⁰ This activity directly aiming at supporting the development and implementation of evidence base for R&I policies and supporting various types of stakeholders is excluded from the delegation to EASME and will be implemented by the Commission services.

⁹¹ This activity directly aiming at supporting the development and implementation of evidence base for R&I policies and supporting various types of stakeholders is excluded from the delegation to EASME and will be implemented by the Commission services.

Indicative number of direct contracts: one in 2018

Indicative duration: 18 months

Type of Action: Public Procurement - direct contract

Indicative timetable: 2nd Quarter of 2018

Indicative budget: EUR 0.15 million from the 2018 budget

6. Educational innovation around nature-based solutions⁹²

Better awareness of the benefits and limitations of nature-based solutions (NBS) has been identified by citizens and experts as one of the main factors that could facilitate the transition to more sustainable cities and territories. However, the educational potential of NBS remains largely unexplored, whilst innovative programmes and resources around NBS are currently missing from formal and informal education programmes for children and families.

Actions should develop innovative educational programmes and materials to raise awareness on nature-based solutions (NBS) and their social, economic and environmental benefits among children, young people and their families in an interdisciplinary (including the gender dimension), problem-based learning approach, combining the use of ICT, audio-visual productions and social media with real-life experiences with local NBS.

Number of contracts: up to 4

Duration of the contracts: up to 24 months

Type of Action: Public Procurement - use of an existing framework contract

Indicative timetable: Second Quarter of 2018

Indicative budget: EUR 0.50 million from the 2018 budget

7. 'Heritage Alive' outreach actions related to the European Year of Cultural Heritage 2018⁹³

This procurement will support the Horizon 2020 "Heritage Alive" policy and programme by supplementing several projects and initiatives related to the European Year of Cultural Heritage (EYCH) 2018.

⁹² This activity is directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to EASME and will be implemented by the Commission services.

⁹³ This activity directly aiming at supporting the development and implementation of evidence base for R&I policies and supporting various types of stakeholders is excluded from the delegation to EASME and will be implemented by the Commission services.

The action will design, launch and implement Heritage Alive outreach activities and accompanying events and actions foreseen for the European Year of Cultural Heritage in 2018 and beyond.

Number of contracts: one

Duration of the contract: 36 months

Type of Action: Public Procurement - use of an existing framework contract

Indicative timetable: 2nd Quarter of 2018

Indicative budget: EUR 0.30 million from the 2018 budget

8. Support actions for raw materials policy (JRC) ⁹⁴

Scientific and technical assistance supporting the implementation, monitoring and evaluation of the European Innovation Partnership (EIP) on Raw Materials and the implementation of raw materials-related actions included in the Circular Economy Action Plan of the European Commission (COM(2015) 614).

This action will cover the delivery of the following items:

- the EIP Annual Monitoring Report on "Raw Materials Commitments";
- the preparatory work and the finalisation of the EIP Strategic Implementation Plan Implementation Document (SIPID) 2017 (e.g. involving stakeholder consultation/meetings, via a Europe-wide questionnaire);
- the preparatory work (e.g. data extraction, development of new indicators) and the finalisation of the Raw Materials Scoreboard 2017 (e.g. involving stakeholder consultation/meetings);
- the completion of the third EIP Call for commitments (preparation of the call and analysis of proposals);
- integrating and developing the elements of the EU Raw materials Knowledge base in the Raw materials Information System;
- raw materials-related actions included in the Circular Economy Action Plan;
- technical assistance on critical raw materials.

Indicative number of direct service contracts: one in 2018

Indicative duration: 36 months

⁹⁴ This activity directly aiming at supporting the development and implementation of evidence base for R&I policies and supporting various types of stakeholders is excluded from the delegation to EASME and will be implemented by the Commission services.

Type of Action: Provision of technical/scientific services by the Joint Research Centre

Indicative timetable: Second Quarter of 2018

Indicative budget: EUR 2.20 million from the 2018 budget

9. IPBES secretariat ⁹⁵

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) is a science-policy interface on biodiversity and ecosystem services that aims to build capacity for and strengthen the use of science in policymaking.

The European Union is now actively participating in the setup and implementation of the work programme of the Platform. The European Union has an enhanced observer status at the UN and may exercise the following procedural rights at IPBES Sessions: the right to speak in turn; the right to reply; the right to introduce proposals; the right to provide views; and the ability to support the implementation of the work programme of the Platform through financial support, among other means. The Commission will pay a contribution on behalf of the EU to the IPBES secretariat with the aim of supporting the IPBES mechanism to further develop work on capacity and knowledge foundations, to communicate and evaluate the Platform's activities, deliverables and findings, including policy tools, and to synthesize, review, assess and critically evaluate relevant information and knowledge on biodiversity and ecosystem services, generated by governments, academia, scientific organizations, non-governmental organizations and indigenous and local communities from the EU and worldwide.

Legal entities:

IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) secretariat, hosted by the German government, UN Campus, Platz der Vereinten Nationen 1, D-53113 Bonn, Germany

Type of Action: Grant to identified beneficiary - Coordination and support actions

Indicative timetable: First Quarter 2018

Indicative budget: EUR 4.00 million from the 2018 budget

⁹⁵ This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders and the promotion of coherent and effective cooperation with third countries is excluded from the delegation to EASME and will be implemented by the Commission services. This grant will be awarded without call for proposals in line with Article 190(1)(e) of the Rules of applications of Regulation (EU, Euratom) 966/2012, Regulation No 1268/2012 and Article 11(2) of the Rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)", Regulation (EU) No 1290/2013.

10. Arctic Science Ministerial – Germany, October 2018⁹⁶

The White House hosted the first-ever Arctic Science Ministerial in 2016. Science Ministers from 25 governments, the European Union, and representatives from Arctic Indigenous peoples' organizations gathered to discuss collective efforts to increase the pace of international scientific collaboration in the Arctic. The format of the Arctic Science Ministerial proved to be very appropriate to advance in sustaining research and observation programmes, with the required support from governments. The European Commission will support the organisation of the Second Arctic Science Ministerial in 2018, in cooperation with the German Government. The 2018 Arctic Science Ministerial will be the first edition to be held in the EU and will be preceded by a scientific session on the latest achievements in relation with the thematic areas that will be the subject of the Ministerial discussion, where also advances on the flagship projects presented at the 2016 Arctic Science Ministerial will be presented. The release of a new Joint Statement will be one of the main objectives of the Ministerial meeting. The EC contribution will also support the participation of representatives from Arctic Indigenous peoples' organizations. Co-funding from the German Government and from other sponsors should be detailed in the proposal.

Legal entities:

The German Federal Ministry of Education and Research (BMBF), Heinemannstraße 2, 53175 Bonn-Bad Godesberg, Germany

Type of Action: Grant to identified beneficiary - Coordination and support actions

Indicative timetable: Fourth Quarter of 2017

Indicative budget: EUR 0.30 million from the 2018 budget

11. Multi-stakeholder design platforms and public-private-people partnerships for sustainable cities⁹⁷

This action should:

⁹⁶ This activity directly aiming at supporting the development and implementation of evidence base for R&I policies, supporting various types of stakeholders and the promotion of coherent and effective cooperation with third countries is excluded from the delegation to EASME and will be implemented by the Commission services. This grant will be awarded without call for proposals in line with Article 190(1)(e) of the Rules of applications of Regulation (EU, Euratom) 966/2012, Regulation No 1268/2012 and Article 11(2) of the Rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)", Regulation (EU) No 1290/2013.

⁹⁷ This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to EASME and will be implemented by the Commission services.

This grant will be awarded without call for proposals in line with Article 190(1)(e) of the Rules of applications of Regulation (EU, Euratom) 966/2012, Regulation No 1268/2012 and Article 11(2) of the Rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)", Regulation (EU) No 1290/2013.

- map and assess existing initiatives and knowledge and come up with guidelines about innovative ways of implementing urban spatial quality through multi-stakeholder design platforms, also accounting for the gender dimension;
- organise face-to-face multi-stakeholder workshops in order to connect all relevant players in the field and stimulate the development of a pan-European sustainable network of active urban design labs in Europe and beyond;
- stimulate the establishment of a European reference framework on innovative urban spatial policy through the network of urban design labs in European cities;
- assess innovative public-private-people partnerships to finance sustainable cities, create a living repository on existing financing instruments such as green bonds, social impact bonds, land-value capture and revolving loan funds, and test such financing instruments against innovative bottom-up, citizen-led business models and financing tools. They should also assess the adequacy of current finance landscape to meet needs of sustainable cities and recommend innovative solutions for covering possible gaps;
- capitalize, as appropriate, on the networking capacity and expertise of the JPI Urban Europe;
- where appropriate, connect with and capitalize upon relevant experience and knowledge generated and tested through activities undertaken within the EU Urban Agenda framework.

Legal entities:

UN Habitat (United Nations Human Settlements Programme), UN Habitat, P.O. Box 30030, GPO, Nairobi, 00100, Kenya

Type of Action: Grant to identified beneficiary - Coordination and support actions

Indicative timetable: 1st Quarter of 2018

Indicative budget: EUR 1.00 million from the 2018 budget

12. Fostering transnational cooperation between National Contact Points (NCP) in the area of Societal Challenge 5: follow-up project⁹⁸

The action will facilitate transnational cooperation between Horizon 2020 NCPs in the area of Societal Challenge 5, with a view to identifying and sharing good practices and raising the

⁹⁸ This activity directly aiming at supporting the development and implementation of evidence base for R&I policies and supporting various types of stakeholders is excluded from the delegation to EASME and will be implemented by the Commission services.

This grant will be awarded without call for proposals in line with Article 190(1)(e) of the Rules of applications of Regulation (EU, Euratom) 966/2012, Regulation No 1268/2012 and Article 11(2) of the Rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)", Regulation (EU) No 1290/2013.

general standard of support to programme applicants, taking into account the diversity of actors that make up the constituency of the sectors relevant to Societal Challenge 5. It will involve one consortium of NCPs focussing on transnational cooperation on issues specific to Societal Challenge 5 sectors, within the context of Horizon 2020 calls for proposals.

All activities must be tailored according to the nature of this sector.

The proposal should show that the activities put forward will deliver tangible benefits to potential applicants. Activities should capitalise on relevant work of the previous NCP network project in this sector, and of the 'NCP Academy' (www.ncpacademy.eu). Various mechanisms may be included, such as benchmarking, joint workshops, enhanced cross-border brokerage events, and specific training linked to the sectors relevant to Societal Challenge 5.

Where relevant, activities should make use of commonly available tools (e.g. for brokerage and partner search, benchmarking tools, guidebooks, promotional tools etc).

To help close the innovation divide, a substantial component of the proposed activities must be devoted to activities aimed at helping NCPs in those countries that have been participating at low levels in the programme up to now. These activities should help these NCPs rapidly acquire the know-how on NCP operations accumulated in other countries including, for example, training, mentoring, and twinning. They may also include awareness raising actions aimed at increasing visibility of well-qualified potential applicant organisations in the above mentioned countries.

The legal entities listed below are the host organisations of NCPs from EU Member States and Associated Countries who have been officially appointed by the relevant national authorities, and who have expressed a willingness to participate in this proposal. NCPs opting not to be a beneficiary are nevertheless invited and encouraged to participate in the project activities (e.g. workshops), and costs for such participation (e.g. travel costs paid by the consortium) may be included in the estimated budget and be eligible for funding by the Commission.

In line with Articles 2, 31.6 and 41.4 of the Model Grant agreement, the project arising from this grant will complement other NCP network projects. This means that the beneficiaries and those of the complementary grants must cooperate and provide access to their results. They must conclude a written collaboration agreement regarding the coordination of the complementary grants and the work of the action.

The project must end by August 2020.

Expected impact:

- An improved, more consistent and professionalised NCP service across Europe, thereby helping simplify access to Horizon 2020 calls, and lowering the entry barriers for newcomers,

- An increase in the quality of proposals submitted, including those from countries where success rates are currently lower than average.

Legal entities:

Dienst voor Wetenschappelijke en Technische Informatie - Service d'information scientifique et technique, Av Louise 231, 1050 Brussels, Belgium

Agence Bruxelloise pour l'Entreprise (Impulse Brussels), Chaussée de Charleroi 110, 1060 Brussels, Belgium

Agencija za Mobilnost i Programe Europske Unije, Frankopanska 26 000, 10000 Zagreb, Croatia

Idryma Proothisis Erevnas, Strovolos 123 23422, 2042 Lefkosia, Cyprus

Technologicke Centrum Akademie Ved Ceske Republiky, Ve Struhach 1076/27, 160 00 Praha, Czech Republic

Sihtasutus Eesti Teadusagentuur, Soola 8, 51013 Tartu, Estonia

Forschungszentrum Julich GmbH, Wilhelm Johnen Strasse 000, 52428 Julich, Germany

Foundation for Research and Technology Hellas, N Plastira Str 100, 70013, Heraklion, Greece

Agenzia per la Promozione Della Ricerca Europea, Via Cavour 71, 00184 Roma, Italy

Luxinnovation Gie, 5, avenue des Hauts Fourneaux, L-4362 Esch-sur-Alzette, Luxembourg

Ministerie van Economische Zaken, Bezuidenhoutseweg 73 20401, 2595 AC, The Hague, Netherlands

Instytut Podstawowych Problemow Techniki Polskiej Akademii Nauk, Adolfa Pawinskiego 5B, 02-106, Warsaw, Poland

Fundacao para a Ciencia e a Tecnologia, Av. D. Carlos I, 126, 1249-074 Lisboa, Portugal

Centrum Vedecko Technickych Informacii Slovenskej Republiky, Lamačska cesta, 8A 000, 81104 Bratislava, Slovakia

Ministrstvo za Izobrazevanje, Znanost in Sport, Masarykova 16, 1000, Ljubljana, Slovenia

CDTI - Centro para el Desarrollo Tecnológico Industrial, c/Cid, 4, 28001 Madrid, Spain

Rannsóknamiðstöð Íslands (The Icelandic Centre for Research), Laugavegur 13, 101 Reykjavik, Iceland

Matimop, Israeli Industry Center for Research & Development, Hamered Street 29 50436, 61500, Tel Aviv, Israel

Institutia de Cercetare si Dezvoltare din Republica Moldova, A. Mateevici 60, MD-2009, Chisinau, Republic of Moldova

Type of Action: Grant to identified beneficiary - Coordination and support actions

Indicative timetable: 2nd Quarter of 2019

Indicative budget: EUR 0.40 million from the 2018 budget

13. Presidency event (conference): 'Europe's Transformation: Where People Matter' – Austria, November 2018⁹⁹

Events of major strategic nature, well focused and with the participation of a broad spectrum of stakeholders are of outmost importance for assessing past activities, identifying policy options and priorities, and planning future actions.

The European Commission will support the organisation of the conference 'Europe's Transformation: Where People Matter' in the November 2018, in cooperation with the Austrian government, holding the EU Presidency of the European Union at the time.

The conference, the fourth international conference on 'Growth in Transition', will be part of the Trio-Presidency programme on Eco-Innovation in the EU. In exploring alternative economic pathways towards a sustainable way of life, the conference will address an issue of major relevance to Societal Challenge 5, with innovation and transformation at the core of the event.

The event will also aim to create better synergy between initiatives launched by the Commission and by the Member States, to the benefit of the overall coherence of actions within the field of research and innovation in the areas covered by Societal Challenge 5. The action should present an appropriate balance between environmental, economic and social elements and points of view, also in the wider context of the UN's Sustainable Development Goals.

Participation of non-EU actors is possible. Outreach activities may be included, such as a press programme or events dedicated to the wider public or schools. To avoid limiting the impact of this kind of event, the subject should not overlap with that of other Presidency events already undertaken or foreseen during the period 2016-2020.

The commitment of the national authorities to support the event both from a political point of view and with resources is a pre-requisite to submit a proposal. Proposals should be supported by the competent Minister, evidenced in a letter included in the proposal. In order to ensure high political and strategic relevance, the active involvement of the competent national authority/authorities will be positively reflected in the evaluation.

⁹⁹ This grant will be awarded without call for proposals in line with Article 190(1)(e) of the Rules of applications of Regulation (EU, Euratom) 966/2012, Regulation No 1268/2012 and Article 11(2) of the Rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)", Regulation (EU) No 1290/2013.

In agreement with the Commission services, the project should ensure appropriate flexibility so as to respond in real time to potentially fast-changing policy scenarios.

The event is expected to result in: improved visibility, in particular in Austria, of the areas covered by Societal Challenge 5, especially with regards to transformation to sustainability; identification of policy options and priorities via review and assessment of developments, and sharing of information and comparison of points of views; and efficient networking of various stakeholders and support to their activities, e.g. natural scientists, social scientists, businesses, investors, local authorities, politicians, administration, non-governmental organisations, environmental organisations, museums and schools.

Legal entities:

Umweltbundesamt GmbH, Spittelauer Lände 5, A-1090 Wien, Austria

Type of Action: Grant to identified beneficiary - Coordination and support actions

Indicative timetable: First Quarter of 2018

Indicative budget: EUR 0.20 million from the 2018 budget

14. Presidency event (conference): 'Sustainable development at the Black Sea' – Romania, first half of 2019¹⁰⁰

Events of major strategic nature, well focused and with the participation of a broad spectrum of stakeholders are of outmost importance for assessing past activities, identifying policy options and priorities, and planning future actions.

The European Commission will support the organisation of the event (conference) 'Sustainable development at the Black Sea' in the first half of 2019, in cooperation with the Romanian government, holding the EU Presidency of the European Union at the time.

In exploring sustainable development in the Black Sea region, the conference will address issues of major relevance to Societal Challenge 5, with innovation at the core of the event. It should aim to create better synergy between initiatives launched by the Commission and by the Member States, to the benefit of the overall coherence of actions within the field of research and innovation in the areas covered by Societal Challenge 5. The action should present an appropriate balance between environmental, economic and social elements and points of view.

Participation of non-EU actors is possible. Outreach activities may be included, such as a press programme or events dedicated to the wider public or schools. To avoid limiting the

¹⁰⁰ This grant will be awarded without call for proposals in line with Article 190(1)(e) of the Rules of applications of Regulation (EU, Euratom) 966/2012, Regulation No 1268/2012 and Article 11(2) of the Rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)", Regulation (EU) No 1290/2013.

impact of this kind of event, the subject should not overlap with that of other Presidency events already undertaken or foreseen during the period 2016-2020.

The commitment of the national authorities to support the event both from a political point of view and with resources is a pre-requisite to submit a proposal. Proposals should be supported by the competent Minister, evidenced in a letter included in the proposal. In order to ensure high political and strategic relevance, the active involvement of the competent national authority/authorities will be positively reflected in the evaluation.

In agreement with the Commission services, projects should ensure appropriate flexibility so as to respond in real time to potentially fast-changing policy scenarios.

The event is expected to result in: improved visibility, in particular in Romania, of the areas covered by Societal Challenge 5; identification of policy options and priorities via review and assessment of developments, and sharing of information and comparison of points of views; and efficient networking of various stakeholders and support to their activities, e.g. natural scientists, social scientists, businesses, investors, local authorities, environmental organisations, museums and schools.

Legal entities:

National Institute for Research and Development of Marine Geology and Geoecology - GeoEcoMar, Str. Dimitrie Onciul, Nr. 23-25, Bucuresti, RO-024053

Type of Action: Grant to identified beneficiary - Coordination and support actions

Indicative timetable: Second Quarter of 2018

Indicative budget: EUR 0.10 million from the 2018 budget

15. Presidency event (conference): 'The sustainable transition to a low carbon, climate-resilient circular economy: Creating the knowledge base' – Helsinki, September 2019¹⁰¹

Events of major strategic nature, well focused and with the participation of a broad spectrum of stakeholders are of outmost importance for assessing past activities, identifying policy options and priorities, and planning future actions.

The European Commission will support the organisation of the event (conference) 'The sustainable transition to a low carbon, climate-resilient circular economy: Creating the knowledge base' in Helsinki in September 2019, in cooperation with the Finnish government, which holds the EU Presidency of the European Union in the second half of 2019.

In exploring the knowledge base for the sustainable transition to a low carbon, climate-resilient circular economy, the conference will address an issue of major relevance to Societal

¹⁰¹ This grant will be awarded without call for proposals in line with Article 190(1)(e) of the Rules of applications of Regulation (EU, Euratom) 966/2012, Regulation No 1268/2012 and Article 11(2) of the Rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)", Regulation (EU) No 1290/2013.

Challenge 5, with innovation at its core. It will aim to create better synergy between initiatives launched by the Commission and by the Member States, to the benefit of the overall coherence of actions within the field of research and innovation in the areas covered by Societal Challenge 5. The action should present an appropriate balance between environmental, economic and social elements and points of view.

Participation of non-EU actors is possible. Outreach activities may be included, such as a press programme or events dedicated to the wider public or schools. To avoid limiting the impact of this kind of event, the subject should not overlap with that of other Presidency events already undertaken or foreseen during the period 2016-2020.

The commitment of the national authorities to support the event both from a political point of view and with resources is a pre-requisite to submit a proposal. Proposals should be supported by the competent Minister, evidenced in a letter included in the proposal. In order to ensure high political and strategic relevance, the active involvement of the competent national authority/authorities will be positively reflected in the evaluation.

In agreement with the Commission services, the project should ensure appropriate flexibility so as to respond in real time to potentially fast-changing policy scenarios.

The event is expected to result in: improved visibility, in particular in Finland, of the areas covered by Societal Challenge 5; identification of policy options and priorities via review and assessment of developments, and sharing of information and comparison of points of views; and efficient networking of various stakeholders and support to their activities, e.g. natural scientists, social scientists, businesses, investors, local authorities, environmental organisations, museums and schools.

Legal entities:

Finnish Ministry of the Environment, P.O.Box 35, 00023 Government, Finland

Type of Action: Grant to identified beneficiary - Coordination and support actions

Indicative timetable: Fourth Quarter of 2018

Indicative budget: EUR 0.10 million from the 2018 budget

16. IPCC secretariat ¹⁰²

The Intergovernmental Panel on Climate Change (IPCC) is the key global climate science-policy interface, underpinning European and international climate policy making and is the leading body responsible for the scientific assessment of climate change. The European Union has an enhanced observer status at the UN and may exercise the following procedural rights at

¹⁰² This grant will be awarded without call for proposals in line with Article 190(1)(e) of the Rules of applications of Regulation (EU, Euratom) 966/2012, Regulation No 1268/2012 and Article 11(2) of the Rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)", Regulation (EU) No 1290/2013.

IPCC Sessions: the right to speak in turn, the right to reply and the right to introduce proposals.

The Commission will contribute on behalf of the EU to the IPCC secretariat (hosted by the World Meteorological Organisation in Geneva, Switzerland) with the aim of supporting the preparation of the next IPCC Assessment Report and facilitating the participation of scientists from the EU and from developing countries in this process. The action will also support the organisation of IPCC high-level dissemination events in Europe, targeting policy makers and other relevant stakeholders, in order to provide timely, high-quality and policy-relevant information and strengthen the science-policy dialogue on climate change.

Legal entities:

IPCC secretariat, hosted by the World Meteorological Organisation, WMO, Geneva, Switzerland

Type of Action: Grant to identified beneficiary - Coordination and support actions

Indicative timetable: Third Quarter 2019

Indicative budget: EUR 4.00 million from the 2019 budget

17. InnovFin Water Innovation Pilot Facility

The water sector could significantly contribute to achieving the EU Circular Economy objectives, meeting the EU priorities on growth and climate as well as some of the UN Sustainable Development Goals, if innovative technologies, processes, and business and governance models in this sector are deployed.

One of the main challenges for the water sector innovation is access to finance. There are a number of market failures and other barriers that prevent water innovation to achieve higher market uptake. The regulated and undervalued price of water that makes water investment less profitable compared to many other sectors but also high investment costs, lock-in in the existing infrastructure are just a few examples of the barriers that make many innovative water projects difficult to finance by the traditional financial instruments.

The 2012 EIB study recommended, amongst other, tackling the funding gap by establishing a dedicated financial instrument. This instrument should be a risk sharing instrument that will be able to cover the higher level of risks (combination of technology risks, market risks and regulatory risks), as well as a high level of required capital expenditure for those projects reaching the higher development and deployment stages. In the current structure of EU financial instruments the most realistic approach would be to create a thematic facility under the InnovFin with a layered investment structure where the highest level of risk (the first loss piece) would be covered by the Horizon 2020 and other EU financial instruments (e.g. LIFE+).

The Water Innovation Pilot Facility aims at providing access to finance, in particular in the form of debt or quasi-equity, to innovative water projects and focusses in priority, but not exclusively, on innovative water-related circular economy projects.

The Facility may support, amongst others, projects that enable water reuse in the industrial, agricultural and municipal setup, extract valuable materials (e.g. biomass, nutrients) from waste water or facilitate more efficient use of water resources. Projects that are not eligible include projects focusing exclusively on energy generation.

This facility will be managed by the EIB as a part of the InnovFin or by an entrusted manager to be selected by the EC.

The InnovFin Water Innovation Pilot Facility is expected to will help in:

- reducing investment risks by investors of the projects financed under this financial instrument, and thereby crowding-in private capital that could help filling the funding gaps;
- de-risking innovative technologies, processes or business models by validating them from a technological or commercial viewpoint, thereby encouraging later investments in their further development or deployment;
- fostering industrial, agricultural and municipal development by securing access to water for all users, facilitating integrated solutions and symbiosis between different water-using sectors and valorising waste water.
- contributing to the EU Circular Economy objectives, climate policy priorities and SDG 6 'Clean water and sanitation' .

Type of Action: Amendment to the Framework Partnership Agreement between the EC and the EIB and first specific grant agreement launching Innovfin Advisory services for the specific action described above

Indicative timetable: 3rd Quarter of 2019

Indicative budget: EUR 10.00 million from the 2019 budget

CALLS and OTHER ACTIONS for 2020¹⁰³

Call - Greening the economy in line with the Sustainable Development Goals (SDGs)¹⁰⁴

H2020-SC5-2018-2019-2020-continued

Indicative topics for 2020

- Raw materials

SC5-10-2020: Raw materials Innovation actions: Mining pilots; Pilots on substitution of Critical Raw Materials

SC5-24-2020: Sustainable management in extractive industries

- Innovating cities for sustainability and resilience

SC5-25-2020: Strengthening EU-China cooperation on sustainable urbanisation: enhanced natural treatment solutions for water security and ecological quality of water in cities

SC5-21-2020: ERA-NET Cofund action(s) for climate action, environment, resource efficiency and raw materials

Other actions for 2020

1. External expertise

Type of Action: Expert Contracts

Indicative budget: EUR 0.25 million from the 2020 budget

2. GEO subscription

Type of Action: Subscription

Indicative budget: EUR 1.00 million from the 2020 budget

3. Support actions for raw materials policy

¹⁰³ The budget amounts for the 2020 budget are indicative and will be subject to a separate financing decision to cover the amounts to be allocated for 2020.

¹⁰⁴ This is the continuation of a call for which information is provided in the first sections of this work programme.

Type of Action: Public Procurement - direct contract

Indicative budget: EUR 0.60 million from the 2020 budget

4. InnovFin Water Innovation Pilot Facility

Type of Action: Amendment to the Framework Partnership Agreement between the EC and the EIB and first specific grant agreement launching Innovfin Advisory services for the specific action described above

Indicative budget: EUR 10.00 million from the 2020 budget

Budget¹⁰⁵

| | Budget line(s) | 2018 Budget (EUR million) | 2019 Budget (EUR million) | 2020 Budget (EUR million) |
|---|---------------------------------|---------------------------|---------------------------|---------------------------|
| Calls | | | | |
| H2020-LC-CLA-2018-2019-2020 | | 123.00 | 111.00 | 192.00 |
| | <i>from</i> <i>08.020305</i> | <i>123.00</i> | <i>111.00</i> | <i>192.00</i> |
| H2020-SC5-2018-2019-2020 | | 219.70 | 259.00 | 81.00 |
| | <i>from</i> <i>08.020305</i> | <i>159.70</i> | <i>176.00</i> | <i>38.00</i> |
| | <i>from</i> <i>02.040301</i> | <i>60.00</i> | <i>83.00</i> | <i>43.00</i> |
| H2020-SC5-2018-2019-2020-continued | | | | 79.00 |
| | <i>from</i> <i>08.020305</i> | | | <i>30.00</i> |
| | <i>from</i> <i>02.040301</i> | | | <i>49.00</i> |
| Contribution from this part to call H2020-EIC-FTI-2018-2020 under Part 17 of the work programme | | 7.10 | 7.10 | 7.10 |
| | <i>from</i> <i>02.040301</i> | <i>1.46</i> | <i>1.46</i> | <i>1.46</i> |
| | <i>from</i> <i>08.020305</i> | <i>5.63</i> | <i>5.63</i> | <i>5.63</i> |
| Other actions | | | | |
| Expert Contracts | | 0.40 | 0.25 | 0.25 |
| | <i>from</i> | <i>0.05</i> | <i>0.05</i> | <i>0.05</i> |

¹⁰⁵ The budget figures given in this table are rounded to two decimal places. The budget amounts for the 2018 budget are subject to the availability of the appropriations provided for in the draft budget for 2018 after the adoption of the budget 2018 by the budgetary authority or, if the budget is not adopted, as provided for in the system of provisional twelfths. The budget amounts for the 2019 and 2020 budget are indicative and will be subject to separate financing decisions to cover the amounts to be allocated for 2019 and for 2020.

Horizon 2020 - Work Programme 2018-2020
Climate action, environment, resource efficiency and raw materials

| | | | | |
|--|---------------------------|---------------|---------------|---------------|
| | <i>02.040301</i> | | | |
| | <i>from 08.020305</i> | <i>0.35</i> | <i>0.20</i> | <i>0.20</i> |
| Subscription | | 1.00 | 1.00 | 1.00 |
| | <i>from 08.020305</i> | <i>1.00</i> | <i>1.00</i> | <i>1.00</i> |
| Public Procurement | | 1.55 | 0.60 | 0.60 |
| | <i>from 02.040301</i> | <i>0.75</i> | <i>0.60</i> | <i>0.60</i> |
| | <i>from 08.020305</i> | <i>0.80</i> | | |
| Provision of technical/scientific services by the Joint Research Centre | | 2.20 | | |
| | <i>from 02.040301</i> | <i>2.20</i> | | |
| Grant to Identified beneficiary | | 6.10 | 4.00 | |
| | <i>from 08.020305</i> | <i>6.02</i> | <i>4.00</i> | |
| | <i>from 02.040301</i> | <i>0.08</i> | | |
| Specific Grant Agreement | | | 10.00 | 10.00 |
| | <i>from 08.020305</i> | | <i>10.00</i> | <i>10.00</i> |
| Estimated total budget | | 361.05 | 392.95 | 370.95 |