

Orientations for Work Programme 2016-2017
Societal Challenge 5 'Climate action, environment, resource efficiency and raw materials'*

Version of 09/02/2015

IMPORTANT NOTICE:

These draft orientations to prepare the Work Programme 2016-2017 for Societal Challenge 5 have been elaborated on the basis of the scoping paper 2016-2017. They are intended to form the basis of discussions with the Programme Committee configuration for Societal Challenges 5 at their meeting on 24 February 2015. The present document does not at this stage cover all relevant aspects and remains subject to change. Information such as indicative budgets per call/area will be provided at later stage.

* Topics marked provisionally with an asterisk indicate relevance to water

Topic 1: Large-scale demonstration projects for the circular economy (2016/2017)

Specific challenge: *[To be developed]*

Sub-topic 2016: Systemic eco-innovation for water management in industrial settings*

Scope: This topic is to support large scale demonstration projects to enable entrepreneurs, industry and researchers to collectively reduce the fresh water needs of the European process industry and to develop methods for a more efficient and sustainable use of water in industry. Efficient water use is closely linked to the efficient use of other resources, such as energy, chemicals, and raw materials. Proposals should aim to demonstrate systemic approaches to water use in industrial settings, also addressing connection to the use of other resources. This focus supports the implementation of the SPIRE PPP Roadmap, while at the same addressing several priorities of the EIP Water, such as water reuse and recycling, water and wastewater treatment, including recovery of resources, and water-energy nexus.

Sub-topic 2017: Towards the next generation of water systems and services*

Scope: The objective of this topic is to develop and test innovative solutions in line with EIP Water priorities. These solutions should support the implementation of the Water Framework Directive and develop the water services of the future at an acceptable cost for consumers, industries and local communities, moving towards a circular economy approach.

Expected impact: *[to be developed]*

Type of action: Innovation actions

Specific feature: In cases of technological innovation, TRL levels 5-7

Topic 2: Systemic, eco-innovative approaches for circular economy (2016/2017)

Specific challenge: Increasing resource productivity in Europe through a more circular model of production and consumption can be an important source of, jobs growth, and competitiveness. Realising the circular economy requires a systemic approach that encompasses the whole value chain(s) and engaging in innovative models of production and consumption. Bringing production processes closer to the final users can boost new consumption patterns that reduce waste, over-production and reduce negative environmental impacts, saving materials and energy. Designing products, processes, systems, and services with a circular economy approach can act as a driver for Europe's re-industrialisation.

Sub-topic 2016: Circular value and supply chains

Scope: To demonstrate through large scale projects that industry can drive the change towards a circular economy through an approach based on the design of value and supply chains that consider the products, processes, and/or systems, as well as the final users, brand owners and the recovery and reuse of material and energy flows in the system of making new products.

Sub-topic 2017: Systemic services for the circular economy

Scope: To demonstrate through large scale projects the economic and environmental feasibility of circular economic business models that underpin new services based on performance/functionality rather than ownership, and on mass customisation. A systemic eco-innovative approach is needed to address all forms of innovation, combining technological, organisational, societal, and behavioural innovation, strengthen the participation of civil society, and to consider possible rebound effects on the environment.

Expected impact: 30% increase in resource productivity in industry; significant reduction of costs for waste management for municipalities and industries; significant material and energy savings.

Type of action: Innovation actions

Specific feature: In cases of technological innovation, TRL levels 5-7

Topic 3: Strategic EU research and innovation for systemic eco-innovation (2016)

Specific challenge: The transition towards a systemic approach to eco-innovation and new circular economy business models should generate jobs, growth and opportunities for development.

Scope: The objective is to support systemic eco-innovation by pooling together the necessary financial resources from the participating national (or regional) research programmes with a view to implementing joint calls for proposals resulting in grants with EU co-funding.

Expected impact: Reduced fragmentation of research and innovation on systemic eco-innovation across Europe.

Type of action: ERA-NET co-fund

Topic 4: Transformations to sustainability (2016)

Specific challenge: To identify and tackle the social transformations needed to make a step change in addressing global environmental challenges and the sustainability of our society and economy.

Scope: To support transdisciplinary research on the complex processes of social transformation to secure effective, equitable and durable solutions that are targeted to local contexts, to comply with the Sustainable Development Goals.

Expected impact: Alignment of EU Member States' and international partners' research programmes towards the objectives set by the Sustainable Development Goals. Development of innovative solutions for society and economy, e.g. new production and consumption models, new business models, etc.

Type of action: ERA-NET co-fund

Specific feature: This topic is conceived in synergy with the Belmont Forum.

Topic 5: Smart Specialisation for systemic eco-innovation/circular economy (2016)

Specific challenge: Regions are a key player in the transition towards a circular economy. However, knowledge on each other's strengths is often limited and the critical mass can be suboptimal. Consequently, developing joint strategies, built on complementarities and respective strengths, can be valuable for the successful realization of their individual, and combined, potential.

Scope: The purpose is to align European regions' Smart Specialisation strategies in support of the transition towards the circular economy, based on a systemic approach. A systemic approach to the circular economy is considered to promote innovation at different levels, by seeking connections between sectors, value chains, market and societal players. The project should establish coherent coordination and support mechanisms among a representative number of regions and establish operational synergies between R&I investments and the Structural Funds so as to foster market uptake and replication of innovative solutions.

Expected impact: Realization of complementary smart specialisation strategies of involved regions to fully exploit opportunities in the transition to a circular economy, maximising economic and job growth potential as well as sustainability.

Type of action: Coordination and support action

Specific feature: Maximum one project will be supported. Proposers must be regional authorities.

Topic 6: Network of business schools: higher education/training on circular economy and green business models (2016)

Specific challenge: To untap the potential of an environmentally sustainable economic growth, it is necessary to mobilise stakeholders on the business opportunities embodied in research and innovation for a “green” economy. As part of the challenge a specific issue is related to filling the circular economy skills gap.

Scope: Creation of a network of business schools with the view of developing a European platform for green innovators. Identification of key knowledge gaps and emerging needs, development of educational models (e.g. courses, masters degrees etc) and the planning of communication and dissemination activities, including the organisation of large-scale events, to underpin higher education on “green business”.

Expected impact: Increased awareness of green and circular economy concepts as part of the background knowledge of future entrepreneurs and managers. New, validated education models.

Type of action: Coordination and support actions

Specific feature: Maximum one project will be supported

Topic 7: New markets in circular economy and macro-economic and social impacts (2016)

Specific challenge: The EU has committed itself to a resource efficient path. In this context, moving towards a circular economy looks a promising pathway. In parallel, innovation is needed to promote economic competitiveness and create new markets. There are many environmental

sectors where applying innovative approaches for promoting the circular economy can be very beneficial. Such sectors include waste, water (including flooding), nature and biodiversity, air quality, soil decontamination; the list is not exhaustive.

For its dialogue on progress with the Member States in the context of, among others, the European Semester, the European Commission needs an extensive assessment of the macro-economic and social and labour market benefits/costs of developing successful and innovative approaches which contribute to the transition towards the circular economy.

Scope: Within the context of the European Semester, the action should:

- identify innovative approaches based on the circular economy concept in Member States;
- assess their economic, social and resource-efficiency impact on existing or new markets;
- estimate such impacts in the short, medium and long term; and
- estimate and assess the macro-economic and social costs and benefits of mainstreaming such approaches.

The project should also elaborate a benchmark between Member States and with a set of performing Third Countries, covering both green and blue growth potentials, with a special focus on sectors like waste and water – and embedding in the analysis the role of digital economy.

Expected impact:

- Sound knowledge base on the macro-economic and social impacts of resource efficiency/circular economy innovations, for both the European Commission and Member States.
- Effective focussing of the European Semester in SC5-related areas.
- Options for policies and investments that are economically, environmentally and socially sound.

Type of action: Coordination and support actions

Specific feature: Maximum one project will be supported

<p style="text-align: center;">Contribution to cross-cutting call: ‘Smart Cities and Communities – with Nature-Based Solutions’</p>
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Topic 1: Demonstrating nature-based solutions in cities*

Specific challenge: *[To be developed]*

Scope: Nature-based solutions can be used for innovative urban design and planning in order to reshape the built environment, deliver multiple benefits to citizens, create opportunities for new economic activities, and foster green growth.

The scope of this topic is to develop and deploy via large-scale demonstration projects novel nature-based solutions and pave the way for their rapid exploitation and replication through a “front-runners” and “followers” cities approach.

Sub-topic 2016: Demonstrating innovative nature-based solutions for energy efficiency and climate resilience in cities

Projects should aim to:

- develop, deploy, test, demonstrate and upscale in the “front-runners” cities as 'living laboratories' innovative systemic and yet locally attuned nature-based solutions co-designed in a multi-stakeholder and participatory context and at district level to improve energy efficiency, reduce energy demand and contribute to climate change mitigation and adaptation. The contribution of social sciences to the design and deployment of the solutions process is considered necessary;
- assist “follower” cities through provision of expertise, advice and capacity building in the development, within the duration of the project, of a sustainable urban planning for successfully deploying nature-based solutions to improve energy efficiency, reduce energy demand and contribute to climate change mitigation and adaptation;
- collect, synthesise and systematically document information and provide evidence on practices and lessons learnt regarding the deployment, cost-effectiveness and performance of nature-based solutions as economically, socially and environmentally viable alternatives to improve energy efficiency, reduce energy demand and enhance climate change mitigation and adaptation; develop methodologies enabling their replication and up-scaling in different contexts; make this evidence base readily accessible to a EU-wide community of relevant city authorities, planners, practitioners, enterprises and other stakeholders through innovative communication strategies.

Proposals should address all of the above points.

Sub-topic 2017: Nature-based solutions for inclusive urban regeneration (including regeneration of deprived districts)

Projects should aim to:

- develop, deploy, test, demonstrate and upscale in the “front-runners” cities as 'living laboratories' innovative systemic and yet locally attuned nature-based solutions co-designed in a multi-stakeholder and participatory context and at district level for inclusive urban regeneration (including through regeneration of deprived districts), reduced crime and security costs, enhanced human health, wellbeing and social cohesion. The contribution of social sciences to the design and deployment of the solutions process is considered necessary;
- assist “follower” cities through provision of expertise, advice and capacity building in the development, within the duration of the project, of a sustainable urban planning for successfully deploying nature-based solutions for inclusive urban regeneration (including through regeneration of their deprived districts), reduced crime and security costs, enhanced human health, wellbeing and social cohesion;
- collect, and synthesise and systematically document information and provide evidence on practices and lessons learnt regarding the deployment, cost-effectiveness and performance of nature-based solutions as economically, socially and environmentally viable alternatives for inclusive urban regeneration (including through regeneration of deprived districts), reduced crime and security costs, enhanced human health, wellbeing and social cohesion; make this evidence base readily accessible to a EU-wide community of relevant city authorities, planners, practitioners, enterprises and other stakeholders through innovative communication strategies.

Proposals should address all of the above points.

Expected impact: *[to be developed]*

Type of action: Innovation actions

Topic 2: New governance, business, financing models & economic impact assessment tools for sustainable cities with nature-based solutions (2016)

Specific challenge: *[To be developed]*

Scope:

- Map and analyse existing successful business models, financing mechanisms and governance arrangements for re-naturing cities to enhance their economic, social and environmental resilience;
- Develop and validate methods, tools, indicators and matrixes for analysing and assessing the effectiveness of business models, financing mechanisms, governance arrangements for re-naturing cities to enhance their economic, social and environmental resilience;
- Propose innovative governance arrangements, business models, financial instruments (e.g. crowd funding), new forms of partnerships (e.g. public-private), strategies for mobilising new investments and creating new business opportunities through re-naturing cities to enhance their economic, social and environmental resilience;

- Identify cultural, social, economic, institutional, legal, regulatory and administrative barriers and bottlenecks at city, regional, national and EU level, including aspects such as citizens' perceptions and willingness to pay to conserve/enhance urban green space, for re-naturing cities to enhance their economic, social and environmental resilience, and recommend ways to overcome them;
- Develop and validate tools to assist decision-making processes; to propose trans-disciplinary approaches and ensure an equitable distribution of costs and benefits at different scales, the development of urban 're-naturing' planning and implementation should be carried out in a multi-stakeholder context, also involving local communities. The contribution of social sciences is considered necessary in this process.

Proposals should address all of the above points.

Expected impact: *[to be developed]*

Type of action: Research and innovation actions

Topic 3: Sustainable urbanisation (2016)*

Specific challenge: *[To be developed]*

Scope: To enable the JPI Urban Europe to launch at least one call in collaboration with the Belmont Forum for international cooperation on sustainable urbanisation. To promote the alignment of R&I agendas and actions in the area of sustainable urbanisation and a co-ordinated streamlining of the implementation of their respective calls.

Expected impact: *[to be developed]* Enhanced excellence and global relevance of sustainable urbanisation R&I activities and increased visibility at international level. Strong and lasting alliance with the funding agencies of key international partners on R&I actions on sustainable urbanisation (i.e. China, Japan, Brazil, Mexico, USA etc.). Linking of possible European and international demonstration actions on re-naturing cities to induce a wider, worldwide application of nature-based solutions.

Type of action: ERA-NET co-fund

Specific feature: This topic is conceived in synergy with the Belmont Forum.

Contribution to cross-cutting call: ‘Blue Growth – demonstrating an ocean of opportunities’

Introduction:

The Arctic is an area of growing strategic importance as the climate changes and economic development accelerates in the Arctic region. In this context, the European Union has an important role to play in supporting successful Arctic cooperation and helping to meet the challenges now facing the region. For the further development of the EU's Arctic policy, three key areas have been proposed:

- supporting research and channelling knowledge to address environmental and climate change in the Arctic
- acting responsibly to help ensure that economic development in the Arctic is based on sustainable use of resources and environmental expertise
- stepping up constructive engagement and dialogue with Arctic states, indigenous peoples and other partners.

In this context, the Transatlantic Ocean Research Alliance established between the EU, the USA and Canada through the Galway declaration in April 2013 addresses the Arctic together with the Atlantic Ocean. The research and innovation areas that follow should contribute to this strategic trilateral cooperation.

Topic 1: Integrated Arctic Observing System (2016)

Specific challenge: The Arctic is the theatre of profound transformations. Climate change is deeply impacting on the sea-ice extension, on ice-sheet melting, on permafrost thawing, and on ocean and land ecosystems. These changes are bringing with them both risks and opportunities, and an integrated Arctic observing system is becoming essential for studying and assessing changes as well as for governing the sustainable development of the region.

Scope: To create an Arctic integrated observing system to provide data and services in view of improving the assessment and prediction capabilities of a number of key issues, such as:

- Arctic changes
- climate system teleconnections
- ecosystems and socio-economic impacts
- effectiveness of adaptation and mitigation strategies.

This shall be built on existing infrastructures (such as, for Europe, ESA space mission data, Copernicus services and in-situ environmental observatories and research infrastructures), under the umbrella of the Group on Earth Observation (GEO), and will be supported by additional activities implemented through the Transatlantic Ocean Research Alliance and with other international cooperation partners. The action should ensure data interoperability through standardisation and quality assurance/quality control (QA/QC) processes, promote database integration and allow free and open access to data and data products, and should contribute through novel technology development to fill out in-situ observational gaps.

Expected impact: *[to be developed]* Contribution to the GEO Cold Region Initiative and to the Transatlantic Ocean Research Alliance.

Type of action: Research and innovation actions

Specific feature: Maximum one project will be supported.

Topic 2: Impact of Arctic changes on weather/climate of northern hemisphere (2016)

Specific challenge: Changes in the Arctic system influence the weather patterns and long-term climate change in the Northern Hemisphere. Europe, as well as North America, is particularly affected by such changes and understanding those changes and their linkages is necessary for developing better prediction tools for weather and climate in Northern latitudes and managing the associated risks

Scope: Understand the processes affecting changes in the Arctic climate and assess their impact on Northern hemisphere's weather and climate including risks related to changing weather patterns, extreme events, droughts and flooding.

Expected impact: *[to be developed]*

Type of action: Research and innovation actions

Specific feature: Contribution to Galway process

Topic 3: Climate impacts on Arctic ecosystems, resources, new economic activities (2017)

Specific challenge: The Arctic is particularly affected by global warming. Glaciers and ice-sheets are melting, sea ice is diminishing and permanently frozen ground is thawing. The opening up of new transport routes and previously inaccessible natural resources magnifies the geo-political and geo-strategic importance of the Arctic, while new economic opportunities and local environmental challenges and threats need to be thoroughly assessed.

Scope: Assess the impact of global warming on Arctic (natural and human) systems and their effect on availability/accessibility of resources and the growth of new economic activities, considering needs of local populations and the economic actors operating in this vulnerable region, in view of sustainable development. Actions should address key processes of change and develop appropriate adaptation and mitigation responses.

Expected impact: *[to be developed]*

Type of action: Research and innovation actions

Specific feature: Contribution to Galway process

Topic 1: Earth Observation services for the monitoring of agricultural production in Africa (2017)

Specific challenge: Food-supply prediction and agriculture risk-assessment remain very challenging tasks that require a lot of information on environmental conditions, crops, livestock etc. This information is usually provided through both remote and in-situ Earth Observation systems. The challenge in this topic is to make agricultural production more predictable by using Earth observation assets made available through the GEOSS and Copernicus programmes.

Scope: Increase the use of Earth observing capabilities and supporting application systems to produce timely, objective, reliable, and transparent crop and livestock production predictions at the national and regional level for the African continent in support of the GEOGLAM and AfriGEOSS initiatives and the EU's development policy. Design and develop methods to assess/monitor agricultural production in Africa and the longer term impacts of its dynamics. The project should foster participatory approaches to collect relevant information and data taking advantage of the growing number of mobile communication devices own by African citizens.

Expected impact: *[to be developed]* Lowered volatility of markets or food and agriculture products. Support to the AfriGEOSS initiative. Support to the EU-Africa High Level Policy Dialogue on science, technology and innovation and the decision endorsed by the Heads of State at the EU-Africa Summit 2014 to work towards a jointly funded EU-Africa Research and Innovation Partnership focusing on food and nutrition security and sustainable agriculture.

Type of action: Research and innovation actions

Specific feature: Maximum one project will be funded.

Call on specific priority areas within Societal Challenge Climate action, environment, resource efficiency and raw materials (final title tbc)

Climate services

Introduction:

The development of climate services will open broad market opportunities both to public and private operators to provide customised high-added-value services to a variety of users in relation to the risks and opportunities that climate change with its impacts may bring to business, administrations and citizens

Topic 1: Demonstrators/pilots for climate services in mature sectors (2016)*

Specific challenge: A critical aspect of growing the climate services market is demonstrating in a meaningful way the added value of climate services and their use in terms of implications for decision-making process. In order to be valuable, climate services must be 'user-centric' and as such need to be co-designed and co-developed through close interaction of both suppliers and users. This market is still in its infancy, and this action will support the real-life user-driven demonstration of climate services in areas where their deployment can already happen at the current state of knowledge, or with limited incremental efforts.

Scope: In mature sectors/cases, to carry out demonstration/pilot projects focusing on the co-design (involving both suppliers and users) of climate services and products, able to identify and demonstrate the value of such services/products in terms of impacts and value from the user's perspective and the value on the market. The action should as well address solutions to tackle the existing barriers which are hampering the full deployment of climate services in the given sector [*Example of sector to be added*]. Responses to a "call for ideas" launched by the European Commission (ref.) have suggested that the application of climate services to the sectors of [...] and of [...] may be sufficiently mature to enter in a demonstration phase¹. However, applicants may build proposals for other applications where the conditions of maturity/readiness exist.

Expected impact: [*To be developed*]

Type of action: Innovation actions

Topic 2: Case studies for climate services in less mature sectors (2017)*

Specific challenge: Climate Services have the potential to be applied to several different business sectors, to the management of public goods and to provide a variety of information and services for the citizens. The success of their development relies on the matching the demand of services and the availability of data and information for responding to users' needs. A co-design process needs therefore to be established for developing future applications in most promising fields.

¹ [*To be completed in March, when the call for ideas has closed.*]

Scope: To co-design (involving both suppliers and users) actions to prepare future climate services showing high added-value and a potential market critical mass. The actions should be designed in the form of case studies involving less mature sectors with the aim to address methodological issues, build capacity and know-how and test relevance of climate services in view of preparing for larger scale demonstration projects in these sectors at a later stage. *[Example: tourism]*.

Expected impact: *[To be developed]*

Type of action: Research and innovation actions

Topic 3: European regional modelling activity (2017)*

Specific challenge: Development of climate services requires the provision of reliable and actionable climate information at local/regional scale. Critical improvements and assessment of regional climate predictions and projections at European level are crucial in supporting the development of climate services.

Scope: Develop further and validate an ensemble of regional climate models with the aim of providing reliable climate information and impact assessment at regional scale in support of climate services in particular for climate change adaptation planning. Conduct a series of multi-method and multi-model experiments in order to better capture uncertainties and provide information which addresses user-needs at various levels.

Expected impact: *[To be developed, including to specify the performance/resolution of the targeted models.]*

Type of action: Research and innovation actions

Topic 4: Climate services roadmap implementation (2017)*

Specific challenge: Following the outcome of the European Workshop 'Towards a European Market of Climate Services' (18th March, 2015), a European Roadmap for Climate services has been prepared by an independent group of experts and presented in a subsequent European Conference on 17th March 2015. The Roadmap identifies a series of challenges and specific actions that need to be undertaken by various actors in Europe, in order to strengthen the European market of climate services.

Scope: Support the implementation of the roadmap on climate services and align actions of the various national climate service centres of Member States. This action should be implemented through a close cooperation with Member States grouped around the JPI Climate, and will take into account relevant actions already carried out in the first H2020 programming cycle.

Expected impact: *[To be developed]*

Type of action: ERA-NET Cofund

Topic 5: Climate services market studies (2016 & 2017)

Specific challenge: In order to enable the growth of the whole climate service market, there is a need to analyse and better understand the current nature and scope of both the demand and supply side and identify its potential for growth in Europe and beyond.

Scope: Actions will address the following issues:

- defining the European and international climate service market characteristics;
- foresight into potential market growth (supply & demand) and into user's needs and capabilities;
- systematic assessment of European climate service providers/purveyors operating at national, European and international levels;
- identification & analysis of main barriers, limitations, enablers, opportunities and untapped potential;
- report on best practices based on 'learning by doing' experience from established climate services and similar providers;
- understanding ethical, legal (liability) and IP implications of the delivery of such services.

(actions will be split over two years, to be specified)

Expected impact: *[To be developed]*

Type of action: Coordination and support action or public procurement (studies) - tbc

Topic 6: IPCC-AR5 knowledge gaps in climate-earth system (2016)

Specific challenge: The 5th Assessment Report of the IPCC (AR5) constitutes a fundamental step forward in our understanding of the climate-earth system and the option available to tackle the climate change challenge. At the same time, there are still important knowledge gaps that need to be addresses in order to design more effectively adaptation and mitigation actions and support decision making at different levels.

Scope: To fill key knowledge gaps in the climate-earth system, as identified in the IPCC AR5, in order to better quantify the impacts of climate change on human and natural systems and design effective and cost-efficient adaptation and mitigation solutions. This action should be implemented through a close cooperation with Member States grouped around the JPI Climate.

Expected impact: *[To be developed]*

Type of action: ERA-NET Cofund

Specific feature: Possible synergy at international level via dedicated Belmont Forum common research agenda.

Topic 7: European platform on climate processes & impacts (2016)

Specific challenge: *[To be developed]*

Scope: Develop a European platform with the aim of fostering close cooperation among international, EU and nationally funded research actions and related initiatives in the field of climate change processes and impacts, perform foresight activities to identify key knowledge gaps and emerging needs, produce synthesis papers on key scientific issues in this area and plan communication and dissemination activities, including the organisation of large-scale events, to foster science-policy interfacing.

Expected impact: *[to be developed]*

Type of action: Coordination and support action

Specific feature: Maximum one project will be funded

Climate-smart Europe

Topic 1: Climate smart Europe (2016 & 2017)

Sub-topic 1: Decarbonisation pathways and transition scenarios for Europe's economy in the timeframe 2030-2050 (2016 & 2017)

Specific challenge: In order to keep climate change below 2°C the European Council reconfirmed in 2011 the EU objective of reducing greenhouse gas emissions by 80-95% by 2050 compared to 1990. Leading the fight against global warming is one of the key priorities of the Energy Union. However, achieving such emission reductions requires tremendous transformations and a deep decarbonisation of the whole economy, especially in energy production and energy consumption. To that end, there is a need to provide comprehensive and widely-acceptable scenarios for cost-effective decarbonisation pathways and address their socio-economic consequences in Europe and beyond.

Scope: Large scale initiative for defining deep decarbonisation pathways for Europe for the 2030-2050 timeframe for achieving the 2050 goals, as well as technological and non-technological wins and business cases related to low carbon economy. To develop stakeholder co-designed scenarios to provide investment predictability and support a forward looking climate and energy policy. These scenarios should address integrated assessment of European/national/local (wide and sectoral) policies, industrial strategies, technological innovation, investment fluxes and financial markets, land-use changes, use of resources, and the capacity of household and citizens to drive deep decarbonised futures.

Expected impact: *[To be developed]*

Type of action: Research and innovation actions

Sub-topic 2: Climate smart Europe initiative stakeholder platform (2016)

Specific challenge: In order to support and better implement the above-mentioned large scale initiative on decarbonisation pathways, there is a need to create a coordination mechanism consisting of personalities and high-level experts, representing all relevant stakeholders that will steer the process and provide guidance during Horizon 2020.

Scope: Create mechanisms including a platform of stakeholders that will allow the coordination of R&I activities under this policy initiative, create links and foster collaboration with relevant national and international activities, provide foresight analysis on emerging issues and knowledge gaps, organise the peer-review process on the evaluation of decarbonisation pathways, organise the stakeholder engagement process and create synthesis/recommendation papers.

Expected impact: *[To be developed]*

Type of action: Coordination and support action

Specific feature: Maximum one project to be funded

Topic 2: Antarctica drilling (2017)

Specific challenge: Ice cores contain unique and quantitative information about past climate forcing and responses and provide valuable information on how climate evolved over a particular period in the past. Previous ice cores and other records have provided important clues, however to comprehensively understand the dynamics and feedbacks and better constrain the climate response to future GHG emissions we need to extend the record/analysis back to 1.5 million years. By studying this so called 'mid-Pleistocene transition' scientists can better unravel the linkages among carbon cycle, ice sheets and climate.

Scope: Preparatory action for extracting and analysing ice-cores extending 1.5 million years into the past in Antarctica to better integrate climate information from ice-core records and climate models in order to constrain climate sensitivity. To define the feasibility and establish a roadmap and overall planning.

Expected impact: *[To be developed]*

Type of action: Coordination and support action

Specific feature: Maximum one project to be funded. Cooperation with EU national funding agencies. Potential for international collaboration (e.g. US, Canada, Japan, China).

Nature-based solutions for resilience

Topic 1: Large-scale demonstrators on nature-based solutions for hydro-meteorological risk reduction (2017)*

Specific challenge: *[To be developed]*

Scope: To develop and deploy via large-scale demonstration projects novel nature-based solutions for hydro-meteorological risk reduction at watershed/landscape level and enable their replication and up-scaling. Projects should aim to:

- develop, test, demonstrate and deploy innovative systemic and yet locally attuned nature-based solutions, including green and blue infrastructure and ecosystem-based management approaches, in rural and natural areas. Solutions should be incorporated in an integrated design concept for land management and planning and be co-designed in a multi-stakeholder and participatory context. The contribution of social sciences in this process is considered necessary.
- develop a comprehensive framework for the comparison of green/grey/hybrid hydro-meteorological risk prevention and reduction solutions, taking into account the effects of climate change and methodologies to support widespread deployment in different contexts;
- collect, synthesise and systematically document information to provide a consolidated evidence-base on co-development processes, performance standards, cost-effectiveness, operational requirements, life cycle costs and the multiple benefits of nature-based solutions as economically, socially and environmentally viable alternatives for hydro-meteorological risk reduction and climate change adaptation at watershed/landscape level. Methodologies and evidence should be made readily accessible to an EU-wide community of competent authorities, planners, practitioners, enterprises and other stakeholders through innovative communication strategies

Proposals should address all of the above points.

Expected impact: *[To be developed]*

Type of action: Innovation actions

Topic 2: Insurance value of ecosystems (2016)

Specific challenge: Insurance value of ecosystems is the value of the sustained capacity of ecosystems to reduce the risks to human society caused by, e.g. natural disasters.

Scope: Assess and operationalize the concept of insurance value of ecosystems, by:

- Analyse the qualitative aspects of ecosystems, including urban ecosystems, needed to sustain the insurance capacity of ecosystems (long-term capacities of ecosystems to reduce risks in terms of stability and resilience against climate change impacts).

- Provide standardised methodologies for translating risk reduction capacity into value for different actors, directly or indirectly involved in the implementation of nature-based solutions.
- Develop best practice for new legal/regulatory and financial frameworks and incentives, for maintaining and/or enhancing the insurance capacity of ecosystems.

Proposals should address all of the above points.

Expected impact: *[To be developed]*

Type of action: Research and Innovation actions

Topic 3: Multi-stakeholder dialogue platform (2016)

Specific challenge: *[To be developed]*

Scope:

- Establish a broad multi-stakeholder (science, policy, business, society) and multi-level (local, regional, national and EU) platform and launch innovation partnerships for developing and testing improved and innovative nature-based solutions (think-and-do-tank).
- Identify and promote successful innovative Nature-Based Solutions, by developing appropriate handbooks and consolidating best practices, and foster stakeholders' ownership and commitment for their large scale deployment.
- Foster dialogue and collaboration across levels (stakeholders and governance) and with key strategic international partners (e.g. developing countries, US, Brazil, SE Asia).

Proposals should address all of the above points.

Expected impact: *[To be developed]*

Type of action: Coordination and support actions

Water

Topic 1: Support international cooperation activities on water (2016)*

Specific challenge: The opening of Water JPI to third country partners is increasingly raising interest among its members and among third countries as demonstrated in recent meetings between EU, third countries such as South Africa and India, and international fora like the Belmont Forum. The objective of this topic is to create a framework and a permanent dialogue to encourage and stimulate the opening of the Water JPI to international cooperation with key international water R&D programmes and funding institutions, including the support to Sustainable Development Goals.

Scope: *[To be developed]*

Expected impact: *[To be developed]*

Type of action: Coordination and support action

Specific feature: Maximum one project will be supported

Topic 2: ERA-NET Cofund on Water (2017)*

Specific challenge: The objective of this topic is to support delivering on priorities identified in the Strategic Research Agenda of the Water JPI, by pooling together 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. The joint call should address the thematic area “Closing the Water Cycle Gap” of the Strategic Research and Innovation Agenda.

Scope: *[To be developed]*

Expected impact: *[To be developed]*

Type of action: ERA-NET Cofund

Topic 3: Food systems and water resources for the development of inclusive, sustainable and healthy Euro-Mediterranean societies

[Placeholder: to be developed]

[Cross-referencing to other topics in the WP addressing water (marked throughout the text with an asterisk) will be included here later.

Indicative list:

- *Large-scale demonstration actions for circular economy*
- *Demonstrators/pilots for climate services in mature sectors*
- *Case studies for climate services in less mature sectors*
- *European regional modelling action*
- *ERA-NET co-fund (JPI Climate) for climate services roadmap implementation*
- *Climate services: market studies*
- *Cross-challenge ERA-NET on applied geosciences*
- *Demonstrating Nature-based Solutions in cities*
- *ERA-NET co-fund: sustainable urbanisation*
- *Large-scale demonstrators on Nature-based Solutions for hydro-meteorological risk reduction*
- *Food systems and water resources for the development of inclusive, sustainable and healthy Euro-Mediterranean societies]*

Topic 1: New solutions for sustainable production of raw materials (2016/2017)

Specific challenge: 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. Securing the sustainable access to raw materials, including metals, industrial minerals and construction raw materials, and particularly Critical Raw Materials (CRM), for the EU economy is of high importance. However, the EU is confronted with a number of technological challenges along the entire raw materials production value chain of primary and secondary raw materials.

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: All proposals should facilitate the market uptake of solutions developed through industrially-driven multidisciplinary consortia covering the relevant value chain. A participation of SMEs with R&D capacities is encouraged.

Related environmental and safety risks should be assessed for all proposed actions.

Proposals should develop solutions validated in lab or in industrially relevant environment, finishing at the level of Technology Readiness Levels (TRL) 4-5.

Sub-topic 2017: New remote exploration technologies

Scope: Proposals should develop new remote exploration technologies able to narrow zones for detailed exploration with lower costs and use innovative multi-method approaches to reprocess existing and new geophysical data, leading to finding new deposits and to re-assessing the mineral potential for the EU. Proposals should include the participation of SMEs, as far as possible.

Sub-topic 2016: Selective low impact mining

Scope: Proposals should develop new selective low impact technological solutions for mining of small mineral deposits (including small complex deposits). The proposals have to clearly show integration of mining solutions with the processing and/or metallurgy steps in order to justify economic viability of the overall process. Proposals should include the participation of SMEs, as far as possible.

Sub-topic 2016: New technologies for the enhanced recovery of accompanying elements

Proposals should, first of all, assess raw material potential of the associated raw materials and metals accompanying the major element at low concentrations in primary or secondary raw materials. Secondly, they should develop energy-, material- and cost-efficient new mineral processing and/or metallurgical technologies and processes to increase the effectiveness of the selectivity and the recovery rates of valuable or critical accompanying materials and elements.

Type of action: Research and innovation actions

Specific feature: TRL levels 4-5

Topic 2: Raw materials Innovation actions (2016/2017)

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

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, to meet ambitious energy and climate 2030 targets and to gain the trust of the EU citizens to raw materials sector.

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: The main objective is to develop pilots demonstrating sustainable production of raw materials in the EU, from primary and/or secondary sources as one of the major targets of the European Innovation Partnership (EIP) on Raw Materials.

All proposals should facilitate the market uptake of solutions developed through industrially-driven multidisciplinary consortia covering the relevant value chain; include an outline of the initial exploitation and business plans, which will be developed further in the proposed project; assess environmental and safety risks for all proposed actions; and justify and target the pilots finishing at Technology Readiness Levels (TRL) 6-8.

Wherever possible, proposers could actively seek synergies, including possibilities for funding, with relevant national / regional research and innovation programmes.

Sub-topic 2016: Intelligent mining

Proposals should develop and demonstrate a new intelligent mining system to increase profitability, to avoid exposure of workers in dangerous operations, and to minimise environmental impacts of the mining operations.

Sub-topic 2017: Processing of lower grade and/or complex primary and secondary materials in the most sustainable and economical ways

Proposals should demonstrate new physical, chemical, biological and / or mechanical processing technologies for the comminution, separation, extraction, pre-treatment and recovery of minerals from low grade /complex ores, industrial minerals or mine tailings at increased efficiency (better yield and process selectivity).

Sub-topic 2017: Sustainable metallurgical processes

Proposals should develop and integrate innovative metallurgical processes, such as pyro-, hydro-, bio-, and/or electro-metallurgical and/or electrochemical processes, in order to enhance the production efficiency, metal recovery and selectivity from primary and/or secondary raw materials.

Type of action: Innovation actions

Specific feature: TRL levels 6-8

Topic 3: Raw materials policy support actions (2016/2017)

Specific Challenge: In order to foster sustainable supply of raw materials within the EU, Europe is confronted with a number of challenges, including land-use planning and competition with other uses as urbanization, nature conservation, agriculture, and infrastructure, social acceptance and trust in exploration and mining activities – what is called Social Licence to Operate (SLO) – and shortage of skilled workforce in certain areas. There are, however, opportunities to utilise synergies between EU, national and regional programmes, particularly linked to the Smart Specialisation strategies.

The EU knowledge base of raw materials has to be strengthened in support of a better raw materials framework in the EU leading to a better environment for investment in raw materials production. Actions on creating primary and secondary raw materials inventories have already been launched. However, the collection systems for primary and secondary raw materials data need to be harmonised and improved to reflect the needs of decision-makers in the public and private sectors.

Proper collection of waste is a pre-condition for optimal recovery of materials from waste. In the EU, Member States and their local governments apply many different waste collection systems. Decision-makers need more information about the performance of different systems, including their economic performance, and a better understanding of the conditions that are necessary for shifting to alternative, better-performing waste collection systems.

Many high value and Critical Raw Materials (CRM) are essential for EU high-tech industries. There is a need to gather the expertise at EU level and to map all the potential sources of and alternatives to Critical Raw Materials.

CRM are contained in Waste Electrical and Electronic Equipment (WEEE) and waste (automotive, industrial and portable) batteries. These metals still have global recycling rates below 1% after decades of use. One of the main reasons is the lack of detailed European standards for treatment of WEEE and waste batteries with a view to maximising the recovery of high value and critical raw materials.

These specific challenges are identified in the Strategic Implementation Plan of the European Innovation Partnership (EIP) on Raw Materials.

Sub-topic 2016: Public awareness, acceptance and trust in mining - Social Licence to Operate (SLO)

Scope: Proposals should define guidelines and develop a toolbox improving communication and transparency during the permitting and licensing procedures and in the production cycle (exploration, mine operation, rehabilitation) by mobilising all the concerned EU's stakeholders (governments, municipalities, mining companies, NGOs and local communities) which can be affected by the mining project. Proposals should use a multidisciplinary approach, involving in particular social sciences, in order to better understand the different aspects of Social Licence to Operate (SLO) in mining in a given cultural context. Proposals should also benchmark the EU

SLO guidelines and initiatives with the ones developed internationally (Canada, Australia, USA, etc...).

Specific feature: Maximum one project will be supported.

Sub-topic 2016: Study on critical raw materials in specific types of e-waste

Scope: Proposals should comprehensively assess the existence of critical raw materials in WEEE and waste batteries within the EU, including a quantification of estimated amounts. The project should contribute to the further development of European standards for the treatment of WEEE optimising the recovery of critical raw materials.

Specific feature: Maximum one project will be supported.

Sub-topic 2017: Good practice in waste collection systems

Scope: The action aims at optimising the waste management performance in the EU. Proposals should map and assess existing waste collection systems in Member States for a wide range of waste streams and end-of-life products, including the advantages of different approaches. The proposals should identify the barriers for implementation, particularly easily removable bottlenecks; as well as good practices in waste collection and logistics. The set of measures necessary for shifting to better-performing systems should be recommended.

Specific feature: Maximum one project will be supported.

Sub-topic 2017: Linking land use planning policies to national mineral policies

Scope: Proposals should review and analyse how exploration and extraction of mineral raw materials in Member States are integrated in land use practices at all levels of implementation (national, regional, local) with the aim to develop a greater compatibility of national minerals policies and legislations and land-use planning policies and practices. Proposals should consider how to best link land-use planning with the concept of safeguarding (such as mineral deposits of public importance) in order in particular to ensure the current and future access to mineral deposits. Proposals should provide recommendations and publish guidance documents to promote an harmonized approach and good practise sharing among Member States in order to ensure a more effective access to raw materials.

Specific feature: Maximum one project will be supported.

Sub-topic 2017: Optimizing collection of raw materials data in Member States

Scope: Proposals should review and analyse the current situation of collection of data in Member States and should provide recommendations for improvement of data sets as well as EU level harmonization. Proposals should involve all mandated key players for primary and secondary mineral based raw materials in Member States including in particular data providers and relevant public authorities and bodies and should provide information on how data and best practices will be shared and made accessible to the wider EU raw materials community.

Specific feature: Maximum one project will be supported.

Sub-topic 2017: EU raw materials regions

Scope: The purpose is to create a network of the EU raw materials regions with common primary or secondary raw materials related objectives in their Smart Specialisation strategies. Potential

synergies between materials, value chains, market and societal players should be utilised. The projects should establish coherent coordination and support mechanisms among a representative number of regions and establish operational synergies between R&I investments and the Structural Funds so as to foster market uptake and replication of innovative solutions.

Sub-topic 2017: Study on critical raw materials in specific types of e-waste

Scope: Proposals should comprehensively assess the existence of critical raw materials in WEEE and waste batteries within the EU, including a quantification of estimated amounts. The project should contribute to the further development of European standards for the treatment of WEEE optimising the recovery of critical raw materials.

Specific feature: Maximum one project will be supported.

Sub-topic 2017: Expert network on Critical Raw Materials

Scope: The proposed action should develop an expert network covering the stakeholders from whole value chain of Critical Raw Materials. Proposal has to deliver a report for the producers and users of raw materials and the policy makers with a complete picture of potential sources of and alternatives to Critical Raw Materials, and with policy and technology recommendations for actions improving the production of primary and secondary Critical Raw Materials, as well as exploring possibilities of their substitution.

Specific feature: Maximum one project will be supported.

Type of action: Coordination and support actions

Topic 4: Raw materials international cooperation (2016/2017)

Specific challenge: Many countries are facing similar and/or linked challenges in the field of raw materials. There is a need to better exploit synergies and enhance the international cooperation with the most developed countries as well as with materials producing countries. Knowledge of raw material flows is dispersed; an understanding of material flow on a global level based on future demands is lacking. At present, there is a shortage of specialists in Europe in some areas related to raw materials production and processing and this is a challenge that needs to be addressed at the European level. Several good examples on development of mining skills policies exist and could be used as models for international cooperation.

These specific challenges are identified in the Strategic Implementation Plan of the European Innovation Partnership (EIP) on Raw Materials.

Sub-topic 2016: Demand-supply forecast and raw materials flows at global level

Scope: Proposals should develop a common methodology to raw materials flows at global level which could be agreed and used at international level. As a pilot case, focus should be on critical raw materials and in particular the ones used in low-carbon technologies. The methodology should incorporate models on demand-supply forecast in order to allow for a more dynamic analysis of global materials flows. Proposals should provide recommendations and feed into future policy developments. In line with the EU's strategy for international cooperation in research and innovation international collaboration with US and Japan in the field of Materials Flow Analysis is encouraged.

Specific feature: Maximum one project will be supported.

Sub-topic 2016: International network of raw materials training centres

Scope: Proposals should create an international network of training centres including the leading educational and research institutions in third based on specific country capabilities to cover the primary raw materials sectors. The network should map skills and knowledge in the EU and third countries, identify key knowledge gaps and emerging needs, develop roadmap for improving skills and knowledge, as well as establish common training programmes in the primary raw materials sectors. The proposals should increase the EU competence and expertise of the mining sector, improve the availability in the EU of workforce and skills in mineral resources related to sectors and enhance the possibility for new cross-industry innovations.

Sub-topic 2017: Strategic international dialogues with raw materials producing countries

Scope: Proposals should map existing initiatives, bodies and funding institutions in raw materials producing countries in the mining sector and create a network of research and industry partners including also partners from raw materials producing countries. The network should aim to increase the participation of EU partners in global/international initiatives in the mining sector, contribute to sharing European best practices and standards, update regularly the database regarding existing initiatives and bodies, and promote a free trade minded approach to minerals trade.

Type of action: Coordination and support actions

Topic 5: ERA-NET Cofund on Raw materials (2016 or 2017 – tbc)

Specific Challenge: EU research and innovation funding for raw materials has been intensified under Horizon 2020. Several Member States have also built the first network of funding agencies in the field called ERA-MIN with remarkable results. However, further integration of national and regional R&I programmes across the whole EU is needed to tap the potential of available funding and to reach the critical mass to push the EU raw materials sector to the forefront in the sustainable raw materials production.

Scope: The objective of the ERA-NET is to strengthen coordination of research programmes in the field of industrial production and supply of raw materials building on the experience of ERA-MIN ERA-NET. This should be achieved in line with the integrated strategy proposed in the EU Raw Materials Initiative (RMI) and the Strategic Implementation Plan of the European Innovation Partnership (EIP) on Raw Materials. The ERA-NET should cover the whole raw

materials value chain including exploration, extraction and processing technologies and recycling, as well as substitution.

Type of action: ERA-NET Cofund

Earth Observation

Topic 1: Novel in-situ observation systems (2017)

Specific challenge: A more systematic observation of the earth system is required at a resolution and accuracy that cannot be provided only through remote sensing. There is therefore a need to update and improved the in-situ component of the Global Earth Observation System of Systems (GEOSS) in order to collect the relevant data necessary to deliver Earth Observation Services for local users and citizens. For this purpose, novel technologies are a powerful tool.

Scope: Development of new, in-situ observation systems, taking advantage of new technology so that measurements can be performed using low energy sensors and communication systems, requiring less demanding maintenance. The R&I activities under this topic may also include new concepts such as citizen observatories, crowdsourcing, disposable sensors, and the use of platforms such as Unmanned Aerial Vehicles (UAVs). The cost effectiveness of deploying the new systems should be an important driver for those developments. Proposals should address terrestrial and/or atmospheric systems.

Expected impact: *[To be developed]* Innovative solutions for the in-situ component of GEOSS.

Type of action: Research and innovation actions

Topic 2: Coordination of citizen observatories initiatives (2017)

Specific challenge: Develop a strategic approach and future orientation for the 'citizen observatory component' of Earth Observation systems.

Scope: This action should analyse FP-funded initiatives *[footnote will list projects]* in the field of Citizens' Observatories, benchmark and pinpoint best practices, identify synergies and facilitate integration and stronger cooperation. Best practices and standards for data visualisation and exploitation in the context of Citizens' Observatories should be promoted via outreach activities. Relevant issues such as citizens' engagement methodologies, sustainability approaches, data privacy and data protection should be addressed. A coherent approach to ensure the delivery and uptake of in-situ data and information through GEOSS and Copernicus should also be in the scope of the action.

Expected impact: *[To be developed]*

Type of action: Coordination and support action

Specific feature: Maximum one project will be funded

Topic 3: European Hub of the GEOSS information system (2016)

Specific challenge: The period 2016-2025 will be crucial in bringing more benefits to users of the Global Earth Observation System of Systems (GEOSS). This will require ensuring long-term user-friendly discovery and access functions for an expanding portfolio of distributed Earth observation resources including data, products, models and services. Achieving this objective, while promoting multi-disciplinary and cross-domain applications, will require further efforts to continue interlinking information systems often developed in isolation.

Scope: To develop a European hub of the GEOSS information system, to capitalise on the advancements in computing architecture, data discovery, analytics technologies and information delivery. Such a European hub shall ensure full interoperability notably with the global GEOSS information system and the Copernicus distribution infrastructure. Special attention shall be given to system adaptability, scalability and robustness while ensuring user-friendliness for multiple user profiles. This knowledge hub should interface with current businesses, policy and scientific uses that increasingly rely on the combination of multiple open data access, cloud services on the web and big data analytics. Data scope for this hub should ideally encompass both in situ and remote sensing Earth observation as well as socio-economic data and information.

Expected impact: *[To be developed]*

Type of action: Research and innovation actions

Specific feature: Maximum one project will be funded

[N.B. Actions on Earth Observation are coordinated with those in the 'Space' and 'Research Infrastructures' parts of the Horizon 2020 and a consolidated list of all relevant topics will be included here and in the relevant parts of the 'Space' and 'Research Infrastructures' Work Programme.]

Cultural heritage for sustainable growth

Topic 1: Cultural heritage as a driver for sustainable growth (2016/2017)

Specific challenge: *[To be developed]*

Scope: To develop and deploy via large-scale projects novel heritage-led solutions for sustainable growth. In order to pave the way for their rapid replication and up-scaling, a “Trailblazers” and “Replicators” approach should be implemented. Projects should aim to:

- map, analyse and document existing successful business models, financing mechanisms, governance structures and legal frameworks for successful heritage-led regeneration, linking where appropriate cultural and natural heritage (Trailblazers). 'Trailblazers', if they so wish,

also have the possibility of further upscaling their regeneration activities during the life of the project;

- assist “Replicators” through provision of expertise, advice and capacity building in developing and implementing during the life of the project their heritage-led regeneration plans;
- collect, synthesise and systematically document information and provide evidence on practices and lessons learnt, as well as toolkits, regarding heritage-led regeneration and make this evidence base readily accessible to an EU-wide community of competent authorities, planners, practitioners, enterprises and stakeholders with a potential interest through innovative communication strategies.

Proposals should address all of the above points.

Sub-topic 2016: Heritage-led urban regeneration

Sub-topic 2017: Heritage-led rural regeneration

Expected impact: *[To be developed]*

Type of action: Innovation actions

Topic 2: Innovative financing, business and governance models for adaptive re-use of cultural heritage (2017)

Specific challenge: *[To be developed]*

Scope:

Projects should:

- map and analyse existing successful business and management models, financing mechanisms and governance arrangements for adaptive re-use of groups of cultural heritage monuments, buildings or sites;
- develop and validate methods, tools, indicators and matrixes for analysing and assessing effectiveness of governance arrangements, business models, financing instruments (e.g. crowd-funding), new forms of partnerships (e.g. public-private, community-based) for adaptive re-use of groups of cultural heritage monuments, buildings or sites. Efforts should be made to link cultural with natural capital where appropriate.
- propose innovative governance arrangements also fostering increased participation by citizens, business models, financial instruments, new forms of partnerships, strategies for mobilising new investments and creating new business opportunities for adaptive re-use of groups of cultural heritage monuments, buildings or sites;
- identify cultural, social, economic, institutional, legal, regulatory and administrative barriers and bottlenecks at city, regional, national and EU level for adaptive re-use of groups of cultural heritage monuments, buildings or sites, and recommend ways to overcome them;

- develop and validate tools to assist decision-making processes, using multi-stakeholder approaches, involving local communities and underpinned by social science expertise, for adaptive re-use of cultural heritage.

Proposals should address all of the above points.

Expected impact: *[To be developed]*

Type of action: Research and Innovation actions

Support to policy

Topic 1: Support to confirmed Presidency events (conferences) (2016/2017)

Specific challenge: *[To be developed]*

Scope: Co-funding of EU Presidency events (generally conferences) in support of SC5 objectives and priorities. Events proposed must be supported as 'official Presidency events' by the Member State in question. Eligible Presidencies are: Slovakia, Malta, the UK and Estonia.

Expected impact: *[To be developed]*

Type of action: Coordination and support actions – grant to named beneficiary

Specific feature: Maximum one event per Presidency will be funded. Maximum contribution per event EUR 300 000.

Topic 2: An R&I roadmap for greening growth (2016)

Specific challenge: When Europe is emerging from the most severe economic crisis in decades, the concept of “green growth” appears as a seductive solution to address several societal challenges in a systemic way: e.g. the long-term implications of climate change, energy shortages and environmental issues; how to create new jobs; how to increase innovation and productivity and maintain international competitiveness in Europe’s areas of potential strength; or how to create new sustainable business.

Under the Horizon 2020 WP2015 an Expert Group was set up to define a R&I Policy Framework for Green Growth and Jobs with the mandate to deliver an “agenda to change” on future EU policy initiatives on green growth. The challenge is thus to transform the new policy framework into a concrete roadmap taking into account the operational factors that could push towards a systemic green growth.

Scope: Produce a roadmap of actions for the implementation of the R&I green growth policy in Europe, based on a comprehensive analytical review of the most recent literature, as well as case studies at country or region level. The roadmap has to be produced and discussed by a consortium of internationally recognised experts in green growth and economic policy, involving also the most relevant stakeholders (e.g. policy-makers, industry, financial institutions and civil

society organisations). The roadmap must be widely recognised as a reference in the field of green growth, based on the consensus of the R&I community and stakeholders, with a strong dissemination.

Expected impact: Sound policy decisions. Green growth in Europe. Creation of a network of stakeholders aimed at facilitating the transition to a green economy through a systemic approach.

Type of action: Coordination and support action

Specific feature: Maximum one project will be supported

PCP/PPI

Topic 1: Pre-commercial procurement on soil decontamination (2017)*

Specific challenge: *[To be developed]*

Scope: A network of public procurers in the area of soil decontamination/remediation to launch a PCP to find common innovative and sustainable solutions for soil decontamination/remediation, avoiding 'dig and dump'.

Expected impact: *[To be developed]*

Type of action: PCP

Topic 2: Preparing for pre-commercial procurement in support of climate action, environment, resource efficiency and raw materials (2016)

Specific challenge: *[To be developed]*

Scope: Bottom-up action to prepare for PCPs in 2018-2019, covering all possible topics of SC5, to deliver 10 PCPs, as required by the general annexes. All preparatory work achieved to launch the PCPs.

Expected impact: *[To be developed]*

Type of action: Coordination and support actions

Specific feature: Duration 12 months

Prizes

Topic 1: Designing inducement prizes for climate action, environment, resource efficiency and raw materials (2016)

Specific challenge: *[To be developed]*

Scope: Design of 5 prizes & implementation/management of 2-3 major prizes starting at the latest June 2017, in any of the SC5 areas. In 2016 the prizes should, if feasible, be in the areas of:

(1) web based applications integrating Earth Observation data (in-situ remote, sensing, citizen observatories, crowdsourcing) that can be further taken up by industry and put on the market (e.g. for urban services, environment and health applications, renewables etc) *[in coordination with LEIT-SPACE]*, and

(2) cultural heritage (see example recommendations in report of Horizon 2020 Expert Group on cultural heritage, e.g. involving youth and/or the media).

[Comment: Prize topic will be defined in generic terms only and will be conditional to a successful design phase. Only the design phase can determine if this is a suitable topic that will lead to a successful prize.]

Expected impact: Launch of effective inducement prizes in areas covered by SC5.

Type of action: Coordination and support action

Specific feature: Maximum one project will be funded. Duration max. 6 months.

Other actions

Topic 1: Inducement prizes for climate action, environment, resource efficiency and raw materials (2017)

Scope: *[Placeholder for the implementation of the 2-3 prizes elaborated in under the CSA mentioned above, to be launched in 2017.]*

Type of action: Prize

Topic 2: GEO subscription (2016/2017)

Scope: Support to the GEO secretariat.

Type of action: Subscription

Topic 3: IPCC secretariat (2017)

Scope: Support to the IPCC secretariat and to the starting of the 6th Assessment Report cycle.

Type of action: Coordination and support action – Grant to named beneficiary (tbc)

Topic 4: Horizon 2020 interim evaluation (2016)

Specific challenge: Article 32(2) of the Regulation No 1281/2013 of 11 December 2013 establishing Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020), states that "By 31 December 2017, and taking into account the ex- post evaluation of the Seventh Framework Programme to be completed by 31 December 2015 (...), the Commission shall carry out, with the assistance of independent experts, selected on the basis of a transparent process, an interim evaluation of Horizon 2020 (...)". This interim evaluation must notably cover "the achievements (at the level of results and progress towards achieving an impact, based, where applicable, on the indicators outlined in Annex II of the specific programme) of the objectives of Horizon 2020 and continued relevance of all related measures".

The interim evaluation of the Horizon 2020 specific programme requires similar assessments of each Societal Challenge, like Societal Challenge 5. However the evaluation report is more than a legal obligation, it is a policy tool that informs the Commission services on the strengths and weaknesses of the Horizon 2020 management and R&I policy actions.

Scope:

- Conducting an interim evaluation of Horizon 2020, covering inputs, outputs, outcomes and impacts of finalised and ongoing projects financed under Horizon 2020's Societal Challenge 5.
- Analyse the outputs, outcomes and impacts of projects funded by FP7, not covered by the Ex Post Evaluation of FP7– Cooperation theme: Environment (including Climate Change), in order to extrapolate their results and conclusions to Horizon 2020.
- Produce operational evidence-based recommendations to the European Commission services.

Expected impact: Improve the management and impacts of Horizon 2020 and the R&I policy of the European Union.

Type of action: Group of experts

Topic 5: Support actions for raw materials policy (2016/2017)

a) Technical assistance supporting the monitoring and evaluation of the European Innovation Partnership (EIP) on Raw Materials;

Type of action: Provision of technical/scientific services by the EC Joint Research Centre (2016/2017)

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

Type of action: Public procurement (2016/2017)

c) Advancing the idea of a World Forum on Raw Materials

Scope:

- Develop a platform of international key experts and stakeholders that would advance the idea of a World Forum on Raw Materials and enhance the international cooperation among G20 Member countries as well as the other third countries active in the mining and other raw materials sectors, engaging with relevant initiatives, such as OECD, International Study Groups, CONNEX, Intergovernmental Forum on Mining, UNEP Resource Panel.
- Identify common needs and threats and it should develop and promote (on international fora) recommendations on possible actions to consolidate the efforts of the countries involved towards a more joint and coherent approach towards raw materials policy and investment.

Type of action: Public procurement (2016)

Contribution to SME Instrument call

Topic 1: Boosting the potential of small businesses in the areas of SC5 [new title tbc] (2016/2017)

Specific challenge: Innovative SMEs have been recognised as being able to become the engine of the green economy and to facilitate the transition to a resource efficient, circular economy. They can play an important role in helping the EU to exit from the economic crises and in job creation. The potential of commercialising innovative solutions from SMEs is however hindered by several barriers including the absence of the proof of concept, the difficulty to access risk finance, the lack of prototyping, insufficient scale-up studies, etc. Growth therefore needs to be stimulated by increasing the levels of innovation in SMEs, covering their different innovation needs over the whole innovation cycle.

Innovative SMEs should be supported and guided to reach and accelerate their full green growth potential. This topic is targeted at all types of eco-innovative² SMEs in all areas addressing the climate action, environment, resource efficiency and raw materials challenge – including but not restricted to the 2016-2017 strategic priorities of systemic eco-innovation and circular economy, nature-based solutions, climate services, sustainable supply of raw materials, earth observation, cultural heritage for sustainable growth, water – focusing on SMEs showing a strong ambition to

² http://ec.europa.eu/environment/eco-innovation/index_en.htm

develop, grow and internationalise. All kinds of promising ideas, products, processes, services and business models, notably across sectors and disciplines, for commercialisation both in a business-to-business (B2B) and a business-to-customer (B2C) context, are eligible.

Scope: *[Standard SME instrument text, as for all SME Instrument topics, as in WP 2014-2015]*

Expected impact: *[Standard SME instrument text to be developed further to make explicit contribution to SC5 objectives and prioritise.]*

Type of action: SME Instrument

Contribution to cross-challenge activities on ‘Sustainable Subsurface Economy’ (SC3)

Topic 1: Cross-challenge ERA-NET on applied geosciences (2016)*

Specific challenge: *[To be developed]*

Scope:

- Develop and enhance the knowledge and the predictive capacity needed to assess the impact of climate change on groundwater resources and dependent surface waters and ecosystems, and the consequences for groundwater quantitative and chemical status.
- Development of models, including uncertainties, and decision support systems for the elaboration of cost-effective measures and assessment of their (cost) effectiveness and decision making taking into account the water-food-energy nexus.
- Regarding non-energy non-agricultural raw materials/minerals part, the ERANET should cover the whole EU in order to enhance and maintain the pan-EU mineral deposits inventory/database and a map of construction, industrial and metalliferous minerals across the EU 28 Member States in a free publicly accessible web format.
- The ERANET should also lead to identifying targets for general mineral exploration that would identify areas for further governmental spending, which is necessary to attract private investment into detailed exploration and mining across the whole EU.

Expected impact: *[to be developed]*

Type of action: ERA-NET Cofund