Science with and for Society
“Opportunities E-Book”
Compilation of topics with relevance for Science with and for Society (SwafS) in 2020 beyond the SwafS programme
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Introduction

This document aims to support Science with and for Society (SwafS) stakeholders in identifying relevant funding opportunities in the 2020 calls in the Horizon 2020 pillars “Industrial Leadership” (Leadership in Enabling and Industrial Technologies) and “Societal Challenges”. The compilation includes topics with at least one SwafS dimension. This analysis covers the following SwafS dimensions (in alphabetical order):

- Citizen Science
- Ethics
- Gender Equality
- Open Access/Open Data
- Public Engagement
- Responsible Research and Innovation (RRI)
- Science Communication
- Science Education

Topics flagged by the European Commission regarding gender equality and RRI are marked with a blue flag in case of gender equality and with an orange flag in case of RRI. Please be aware that our report includes additional topics with gender equality and a RRI reference.

We classified a number of topics as including RRI and Public Engagement – transitions are fluid and depend on the respective assessment. Please also note the SwafS category Citizen Science has only been chosen for topics which explicitly use this term. SwafS stakeholders are therefore encouraged to take a close look at the respective topics.

The document compiles the following information for each topic:

- SwafS related key word(s)
- Topic description
- Deadline for the submission of proposals
- Direct link to the respective topic in the Funding & Tenders Portal

To facilitate navigation in this document, the first pages give an overview of the topics organised by SwafS key words, thus allowing to easily identify possible funding opportunities according to the preferred SwafS dimension (please be aware that topics which we classified as including RRI and Public Engagement are categorized as “Public Engagement & Responsible Research and Innovation (RRI)”). This overview is followed by full topic descriptions mirroring the Horizon 2020 structure, in this case the Horizon 2020 pillars “Industrial Leadership (Leadership in enabling and industrial technologies)” and “Societal Challenges”.
SwafS dimensions are integrated to varying extents in the different topics. Topics with a strong integration of one or more SwafS dimensions are, e.g.:

- **FNR-10-2020**: Public engagement for the Bioeconomy
- **CE-FNR-07-2020**: FOOD 2030 - Empowering cities as agents of food system transformation
- **LC-SC3-EC-3-2020**: Consumer engagement and demand response
- **NMBP-38-2020**: Citizens and industrial technologies

**Disclaimer**

Call information may change. Stakeholders should always check the Funding and Tenders Portal for the latest information on calls. While every effort has been made to ensure that the information contained in this document is accurate and up to date, SiS.Net³ does not assume any liability or responsibility for the completeness, accuracy, or usefulness of the information included in this document. Information is provided strictly “as is”.

**SiS.Net³** is the international network of National Contact Points for Science with and for Society in Horizon 2020. For more information please visit [http://www.sisnetwork.eu](http://www.sisnetwork.eu).
Topics by Keyword

Citizen Science

I. INDUSTRIAL LEADERSHIP - LEADERSHIP IN ENABLING AND INDUSTRIAL TECHNOLOGIES

Space

Call – Space 2018-2020
- LC-SPACE-18-EO-2020: Copernicus evolution: Research activities in support of the evolution of the Copernicus services

II. SOCIETAL CHALLENGES

Societal Challenge 4: Smart, green and integrated transport

Call - 2018-2020 Mobility for Growth
- MG-3-6-2020: Towards sustainable urban air mobility
- MG-4-9-2020: The European mobility culture of tomorrow: Reinventing the wheel?

Societal Challenge 5: Climate action, environment, resource efficiency and raw materials

Call - Building a low-carbon, climate resilient future: climate action in support of the Paris Agreement
- LC-CLA-10-2020: Scientific support to designing mitigation pathways and policies
- LC-CLA-11-2020: Innovative nature-based solutions for carbon neutral cities and improved air quality
- LC-CLA-12-2020: Advancing climate services
- LC-CLA-19-2020: Integrated GEOSS climate applications to support adaptation and mitigation measures of the Paris Agreement
- LC-CLA-20-2020: Supporting the implementation of GEOSS in the Arctic in collaboration with Copernicus

Call – Greening the economy in line with the Sustainable Development Goals (SDGs)
- SC5-33-2020: Monitoring ecosystems through research, innovation and technology
- SC5-32-2020: Addressing wild pollinators decline and its effects on biodiversity and ecosystem services
Ethics

I. INDUSTRIAL LEADERSHIP - LEADERSHIP IN ENABLING AND INDUSTRIAL TECHNOLOGIES

Information and Communication Technologies

Call - Information and Communication Technologies
- **ICT-46-2020**: Robotics in Application Areas and Coordination & Support
- **ICT-47-2020**: Research and Innovation boosting promising robotics applications
- **ICT-48-2020**: Towards a vibrant European network of AI excellence centres
- **ICT-38-2020**: Artificial intelligence for manufacturing
- **ICT-54-2020**: Blockchain for the Next Generation Internet

Call - Digitising and transforming European industry and services: digital innovation hubs and platforms
- **DT-ICT-03-2020**: I4MS (phase 4) - uptake of digital game changers
- **DT-ICT-12-2020**: AI for the smart hospital of the future

Call – Cybersecurity
- **SU-ICT-02-2020**: Building blocks for resilience in evolving ICT systems

Nanotechnologies, Advanced Materials, Biotechnology and Advanced Manufacturing and Processing

Call – Transforming European Industry
- **NMBP-21-2020**: Biological scaffolds for tissue regeneration and repair (RIA)

Call – Industrial Sustainability
- **DT-SPIRE-11-2020**: Artificial Intelligence and Big Data Technologies for Process Industries (CSA)

II. SOCIETAL CHALLENGES

Societal Challenge 1: Health, demographic change and wellbeing

Call - Better Health and care, economic growth and sustainable health systems
- **SC1-BHC-06-2020**: Digital diagnostics – developing tools for supporting clinical decisions by integrating various diagnostic data
- **SC1-HCO-17-2020**: Coordinating and supporting research on the human microbiome in Europe and beyond
- **SC1-BHC-08-2020**: New interventions for Non-Communicable Diseases
- **SC1-BHC-35-2020**: Creation of a European wide sustainable network for harmonised large-scale clinical research studies for infectious diseases
SwafS Opportunities

- **SC1-BHC-37-2020**: Towards the new generation of clinical trials – trials methodology research
- **SC1-DTH-12-2020**: Use of Real-World Data to advance research on the management of complex chronic conditions
- **SC1-DTH-13-2020**: Implementation research for scaling up and transfer of innovative solutions involving digital tools for people-centred care
- **SC1-HCC-10-2020**: Towards a Health research and innovation Cloud: Capitalising on data sharing initiatives in health research

**Call – Digital transformation in Health and Care**

- **SC1-DTH-02-2020**: Personalised early risk prediction, prevention and intervention based on Artificial Intelligence and Big Data technologies
- **SC1-DTH-04-2020**: International cooperation in smart living environments for ageing people
- **SC1-DTH-14-2020**: Pre-commercial Procurement for Digital Health and Care Solutions
- **SC1-HCC-06-2020**: Coordination and Support to better data and secure cross-border digital infrastructures building on European capacities for genomics and personalised medicine
- **SC1-HCC-07-2020**: Support for European eHealth Interoperability roadmap for deployment
- **SC1-HCC-09-2020**: Supporting deployment of eHealth in low and lower middle income countries in Africa for better health outcomes

**Call – Trusted digital solutions and Cybersecurity in Health and Care**

- **DT-TDS-04-2020**: AI for Genomics and Personalised Medicine
- **DT-TDS-05-2020**: AI for Health Imaging

**Societal Challenge 2: Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bioeconomy**

**Call – Food and Natural Resources**

- **FNR-11-2020**: Prospecting aquatic and terrestrial natural biological resources for biologically active compounds
- **FNR-16-2020**: Enzymes for more environment-friendly consumer products

**Societal Challenge 3: Secure, clean and efficient energy**

**Call – Building a low-carbon, climate resilient future**

- **LC-SC3-B4E-3-2020**: Upgrading smartness of existing buildings through innovations for legacy equipment
- **LC-SC3-B4E-5-2020**: Integrated design concepts for energy-efficient ICT in buildings
- **LC-SC3-B4E-6-2020**: Big data for buildings
- **LC-SC3-B4E-7-2020**: European building stock data 4.0
- **LC-SC3-B4E-10-2020**: Self-assessment and self-optimisation of buildings and appliances for a better energy performance
- **LC-SC3-EC-1-2018-2019-2020**: The role of consumers in changing the market through informed decision and collective actions
• **LC-SC3-EC-3-2020**: Consumer engagement and demand response

### Societal Challenge 6: Europe in a changing world – Inclusive, innovative and reflective societies

**Call – Migration**
- **MIGRATION-09-2020**: Narratives on migration and its impact: past and present

**Call – Socioeconomic and Cultural Transformations in the Context of the Fourth Industrial Revolution**
- **DT-TRANSFORMATIONS-02-2018-2019-2020**: Transformative impact of disruptive technologies in public services
- **TRANSFORMATIONS-15-2020**: Society and innovations: understanding the contexts, processes and consequences

**Call – Governance for the Future**
- **DT-GOVERNANCE-12-2019-2020**: Pilot on using the European cloud infrastructure for public administrations

### Societal Challenge 7: Secure societies - Protecting freedom and security of Europe and its citizens

**Call – Artificial Intelligence and security: providing a balanced assessment of opportunities and challenges for Law Enforcement in Europe**
- **SU-AI01-2020**: Developing a research roadmap regarding Artificial Intelligence in support of Law Enforcement
- **SU-AI02-2020**: Secure and resilient Artificial Intelligence technologies, tools and solutions in support of Law Enforcement and citizen protection, cybersecurity operations and prevention and protection against adversarial Artificial Intelligence
- **SU-AI03-2020**: Human factors, and ethical, societal, legal and organisational aspects of using Artificial Intelligence in support of Law Enforcement

**Call – Security**
- **SU-DRS02-2018-2019-2020**: Technologies for first responders
- **SU-FCT01-2018-2019-2020**: Human factors, and social, societal, and organisational aspects to solve issues in fighting against crime and terrorism
- **SU-FCT02-2018-2019-2020**: Technologies to enhance the fight against crime and terrorism
- **SU-FCT03-2018-2019-2020**: Information and data stream management to fight against (cyber)crime and terrorism
- **SU-BES01-2018-2019-2020**: Human factors, and social, societal, and organisational aspects of border and external security
- **SU-BES02-2018-2019-2020**: Technologies to enhance border and external security
- **SU-BES03-2018-2019-2020**: Demonstration of applied solutions to enhance border and external security
- **SU-GM02-2018-2020**: Strategic pre-commercial procurements of innovative, advanced systems to support security

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**Gender Equality**

I. **INDUSTRIAL LEADERSHIP - LEADERSHIP IN ENABLING AND INDUSTRIAL TECHNOLOGIES**

**Information and Communication Technologies**

**Call - Information and Communication Technologies**
- **ICT-46-2020**: Robotics in Application Areas and Coordination & Support
- **ICT-48-2020**: Towards a vibrant European network of AI excellence centres
- **ICT-49-2020**: Artificial Intelligence on demand platform
- **ICT-54-2020**: Blockchain for the Next Generation Internet
- **ICT-57-2020**: An empowering, inclusive Next Generation Internet

**Call - Digitising and transforming European industry and services: digital innovation hubs and platforms**
- **DT-ICT-03-2020**: I4MS (phase 4) - uptake of digital game changers

**Nanotechnologies, Advanced Materials, Biotechnology and Advanced Manufacturing and Processing**

**Call – Foundations for Tomorrow’s Industry**
- **NMBP-38-2020**: Citizens and industrial technologies (CSA)

**Call – Transforming European Industry**
- **NMBP-21-2020**: Biological scaffolds for tissue regeneration and repair (RIA)
- **CE-BIOTEC-09-2020**: Upcycling Bio Plastics of food and drinks packaging (RIA)

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II. **SOCIETAL CHALLENGES**

**Societal Challenge 1: Health, demographic change and wellbeing**

**Call - Better Health and care, economic growth and sustainable health systems**
- **SC1-BHC-06-2020**: Digital diagnostics – developing tools for supporting clinical decisions by integrating various diagnostic data
- **SC1-HCO-03-2020**: Bridging the divide in health research and innovation – boosting return on investment
- **SC1-HCO-17-2020**: Coordinating and supporting research on the human microbiome in Europe and beyond
- **SC1-BHC-08-2020**: New interventions for Non-Communicable Diseases
- **SC1-HCO-18-2020**: Developing methodological approaches for improved clinical investigation and evaluation of high-risk medical devices
SwafS Opportunities

- **SC1-HCO-19-2020**: Reliable and accessible information on cell and gene-based therapies
- **SC1-BHC-17-2020**: Global Alliance for Chronic Diseases (GACD) - Prevention and/or early diagnosis of cancer
- **SC1-BHC-20B-2020**: Public procurement of innovative solutions (PPI) for diagnostics for infectious diseases
- **SC1-BHC-33-2020**: Addressing low vaccine uptake
- **SC1-BHC-34-2020**: New approaches for clinical management and prevention of resistant bacterial infections in high prevalence settings
- **SC1-BHC-35-2020**: Creation of a European wide sustainable network for harmonised large-scale clinical research studies for infectious diseases
- **SC1-BHC-24-2020**: Healthcare interventions for the management of the elderly multimorbid patient
- **SC1-BHC-37-2020**: Towards the new generation of clinical trials – trials methodology research
- **SC1-HCO-20-2020**: Coordination of clinical research activities of the European Reference Networks
- **SC1-BHC-29-2020**: Innovative actions for improving urban health and wellbeing - addressing environment, climate and socioeconomic factors
- **SC1-BHC-36-2020**: Micro- and nano-plastics in our environment: Understanding exposures and impacts on human health
- **SC1-DTH-12-2020**: Use of Real-World Data to advance research on the management of complex chronic conditions
- **SC1-DTH-13-2020**: Implementation research for scaling up and transfer of innovative solutions involving digital tools for people-centred care
- **SC1-HCC-10-2020**: Towards a Health research and innovation Cloud: Capitalising on data sharing initiatives in health research

**Call – Digital transformation in Health and Care**

- **SC1-DTH-02-2020**: Personalised early risk prediction, prevention and intervention based on Artificial Intelligence and Big Data technologies
- **SC1-DTH-04-2020**: International cooperation in smart living environments for ageing people
- **SC1-DTH-06-2020**: Accelerating the uptake of computer simulations for testing medicines and medical devices
- **SC1-DTH-14-2020**: Pre-commercial Procurement for Digital Health and Care Solutions
- **SC1-HCC-09-2020**: Supporting deployment of eHealth in low and lower middle income countries in Africa for better health outcomes

**Call – Trusted digital solutions and Cybersecurity in Health and Care**

- **DT-TDS-04-2020**: AI for Genomics and Personalised Medicine
- **DT-TDS-05-2020**: AI for Health Imaging
Societal Challenge 2: Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bioeconomy

Call - Sustainable Food Security
- **SFS-04-2019-2020**: Integrated health approaches and alternatives to pesticide use

Call – Blue Growth
- **BG-10-2020**: Fisheries in the full ecosystem context

Call – Rural Renaissance
- **RUR-07-2020**: Reducing food losses and waste along the agri-food value chain

Call – Food and Natural Resources
- **FNR-03-2020**: A comprehensive vision for urban agriculture
- **CE-FNR-07-2020**: FOOD 2030 - Empowering cities as agents of food system transformation
- **FNR-08-2020**: Supporting the food safety systems of the future

Societal Challenge 3: Secure, clean and efficient energy

Call – Building a low-carbon, climate resilient future
- **LC-SC3-EC-2-2018-2019-2020**: Mitigating household energy poverty
- **LC-SC3-EC-3-2020**: Consumer engagement and demand response
- **LC-SC3-ES-4-2018-2020**: Decarbonising energy systems of geographical Islands
- **LC-SC3-SCC-1-2018-2020**: Smart Cities and Communities
- **LC-SC3-SCC-2-2020**: Positive Energy Districts and Neighbourhoods for urban energy transitions
- **LC-SC3-CC-1-2018-2019-2020**: Social Sciences and Humanities (SSH) aspects of the Clean-Energy Transition

Societal Challenge 4: Smart, green and integrated transport

Call - 2018-2020 Mobility for Growth
- **LC-MG-1-12-2020**: Cities as climate-resilient, connected multimodal nodes for smart and clean mobility: new approaches towards demonstrating and testing innovative solutions
- **LC-MG-1-14-2020**: Understanding and mitigating the effects on public health of emerging non-regulated nanoparticle emissions issues and noise
- **MG-2-12-2020**: Improving road safety by effectively monitoring working patterns and overall fitness of drivers
- **MG-2-14-2020**: The effects of automation on the transport labour force, future working conditions and skills requirements
- **MG-3-6-2020**: Towards sustainable urban air mobility
- **MG-4-8-2020**: Advanced research methods and tools in support of transport/mobility researchers, planners and policy makers
• **MG-4-9-2020**: The European mobility culture of tomorrow: Reinventing the wheel?
• **MG-4-10-2020**: Improving impact and broadening stakeholder engagement in support of transport research and innovation

**Call - 2018-2020 Digitising and Transforming European Industry and Services: Automated Road Transport**
• **DT-ART-06-2020**: Large-scale, cross-border demonstration of connected and highly automated driving functions for passenger cars

**Societal Challenge 5: Climate action, environment, resource efficiency and raw materials**

**Call - Building a low-carbon, climate resilient future: climate action in support of the Paris Agreement**
• **LC-CLA-10-2020**: Scientific support to designing mitigation pathways and policies
• **LC-CLA-11-2020**: Innovative nature-based solutions for carbon neutral cities and improved air quality
• **LC-CLA-14-2020**: Understanding climate-water-energy-food nexus and streamlining water-related policies
• **LC-CLA-15-2020**: Forest Fires risk reduction: towards an integrated fire management approach in the E.U.

**Call – Greening the economy in line with the Sustainable Development Goals (SDGs)**
• **CE-SC5-24-2020**: Improving the sorting, separation and recycling of composite and multi-layer materials
• **CE-SC5-25-2020**: Understanding the transition to a circular economy and its implications on the environment, economy and society
• **SC5-27-2020**: Strengthening international collaboration: enhanced natural treatment solutions for water security and ecological quality in cities

**Societal Challenge 6: Europe in a changing world – Inclusive, innovative and reflective societies**

**Call – Migration**
• **MIGRATION-04-2020**: Inclusive and innovative practices for the integration of recently arrived migrants in local communities
• **MIGRATION-05-2018-2020**: Mapping and overcoming integration challenges for migrant children
• **MIGRATION-09-2020**: Narratives on migration and its impact: past and present
• **MIGRATION-10-2020**: Sustainable practices for the integration of newly arrived migrants into societies

**Call – Socioeconomic and Cultural Transformations in the Context of the Fourth Industrial Revolution**
• **DT-TRANSFORMATIONS-02-2018-2019-2020**: Transformative impact of disruptive technologies in public services
• **TRANSFORMATIONS-10-2020**: Evolving European media landscapes and Europeanisation
- **TRANSFORMATIONS-15-2020**: Society and innovations: understanding the contexts, processes and consequences
- **TRANSFORMATIONS-18-2020**: Technological transformations, skills and globalization - future challenges for shared prosperity
- **TRANSFORMATIONS-22-2020**: Enhancing access and uptake of education to reverse inequalities

**Call – Governance for the Future**
- **SU-GOVERNANCE-09-2020**: Addressing radicalization through social inclusion

**Societal Challenge 7: Secure societies - Protecting freedom and security of Europe and its citizens**

**Call – Artificial Intelligence and security: providing a balanced assessment of opportunities and challenges for Law Enforcement in Europe**
- **SU-AI02-2020**: Secure and resilient Artificial Intelligence technologies, tools and solutions in support of Law Enforcement and citizen protection, cybersecurity operations and prevention and protection against adversarial Artificial Intelligence
- **SU-AI03-2020**: Human factors, and ethical, societal, legal and organisational aspects of using Artificial Intelligence in support of Law Enforcement

**Call – Security**
- **SU-DRS01-2018-2019-2020**: Human factors, and social, societal, and organisational aspects for disaster-resilient societies
- **SU-DRS02-2018-2019-2020**: Technologies for first responders
- **SU-FCT01-2018-2019-2020**: Human factors, and social, societal, and organisational aspects to solve issues in fighting against crime and terrorism
- **SU-BES01-2018-2019-2020**: Human factors, and social, societal, and organisational aspects of border and external security

**Open Access/Open Data**

**I. **INDUSTRIAL LEADERSHIP - LEADERSHIP IN ENABLING AND INDUSTRIAL TECHNOLOGIES**

**Information and Communication Technologies**

**Call - Information and Communication Technologies**
- **ICT-48-2020**: Towards a vibrant European network of AI excellence centres
- **ICT-54-2020**: Blockchain for the Next Generation Internet
- **ICT-57-2020**: An empowering, inclusive Next Generation Internet

**Call - Digitising and transforming European industry and services: digital innovation hubs and platforms**
- **DT-ICT-04-2020**: Photonics Innovation Hubs
• **DT-ICT-05-2020**: Big Data Innovation Hubs
• **DT-ICT-09-2020**: Boost rural economies through cross-sector digital service platforms

**Call – Cybersecurity**
• **SU-ICT-02-2020**: Building blocks for resilience in evolving ICT systems

**Nanotechnologies, Advanced Materials, Biotechnology and Advanced Manufacturing and Processing**

**Call – Foundations for Tomorrow’s Industry**
• **DT-NMBP-04-2020**: Open Innovation Test Beds for nano-enabled bio-based materials (IA)
• **DT-NMBP-05-2020**: Open Innovation Test Beds for materials for building envelopes (IA)
• **DT-NMBP-06-2020**: Open Innovation Test Beds for nano-pharmaceuticals production (IA)
• **DT-NMBP-11-2020**: Open Innovation Platform for Materials Modelling (RIA)
• **DT-NMBP-39-2020**: Towards Standardised Documentation of Data through taxonomies and ontologies (CSA)
• **DT-NMBP-40-2020**: Creating an open market place for industrial data (RIA)

**Call – Transforming European Industry**
• **DT-FOF-10-2020**: Pilot lines for large-part high-precision manufacturing (IA 50%)
• **NMBP-21-2020**: Biological scaffolds for tissue regeneration and repair (RIA)
• **DT-NMBP-23-2020**: Next generation organ-on-chip (RIA-LS)

**Space**

**Call – Space 2018-2020**
• **DT-SPACE-01-EO-2018-2020**: Copernicus market uptake
• **LC-SPACE-18-EO-2020**: Copernicus evolution: Research activities in support of the evolution of the Copernicus services

II. **Societal Challenges**

**Societal Challenge 1: Health, demographic change and wellbeing**

**Call - Better Health and Care, economic growth and sustainable health systems**
• **SC1-HCO-17-2020**: Coordinating and supporting research on the human microbiome in Europe and beyond
• **SC1-BHC-17-2020**: Global Alliance for Chronic Diseases (GACD) - Prevention and/or early diagnosis of cancer
• **SC1-DTH-12-2020**: Use of Real-World Data to advance research on the management of complex chronic conditions
• **SC1-DTH-13-2020**: Implementation research for scaling up and transfer of innovative solutions involving digital tools for people-centred care
• **SC1-HCC-10-2020**: Towards a Health research and innovation Cloud: Capitalising on data sharing initiatives in health research

**Call – Digital transformation in Health and Care**

• **SC1-DTH-02-2020**: Personalised early risk prediction, prevention and intervention based on Artificial Intelligence and Big Data technologies
• **SC1-DTH-04-2020**: International cooperation in smart living environments for ageing people
• **SC1-DTH-14-2020**: Pre-commercial Procurement for Digital Health and Care Solutions
• **SC1-HCC-07-2020**: Support for European eHealth Interoperability roadmap for deployment

**Call – Trusted digital solutions and Cybersecurity in Health and Care**

• **DT-TDS-04-2020**: Ai for Genomics and Personalised Medicine
• **DT-TDS-05-2020**: Ai for Health Imaging

**Societal Challenge 2: Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bioeconomy**

**Call - Sustainable Food Security**

• **SFS-06-2018-2020**: Stepping up integrated pest management

**Call – Blue Growth**

• **BG-07-2019-2020**: The Future of Seas and Oceans Flagship Initiative
• **BG-11-2020**: Towards a productive, healthy, resilient, sustainable and highly-valued Black Sea

**Call – Food and Natural Resources**

• **CE-FNR-09-2020**: Pilot action for the removal of marine plastics and litter

**Societal Challenge 3: Secure, clean and efficient energy**

**Call – Building a low-carbon, climate resilient future**

• **LC-SC3-B4E-6-2020**: Big data for buildings
• **LC-SC3-B4E-7-2020**: European building stock data 4.0
• **LC-SC3-EC-3-2020**: Consumer engagement and demand response
• **LC-SC3-ES-5-2018-2020**: TSO – DSO – Consumer: Large-scale demonstrations of innovative grid services through demand response, storage and small-scale (RES) generation

**Other Actions**

• Research-oriented data sets and open access database
Societal Challenge 4: Smart, green and integrated transport

Call - 2018-2020 Mobility for Growth
- **MG-4-7-2020**: Digitalisation of the transport system: data sharing

Societal Challenge 5: Climate action, environment, resource efficiency and raw materials

Call - Building a low-carbon, climate resilient future: climate action in support of the Paris Agreement
- **LC-CLA-11-2020**: Innovative nature-based solutions for carbon neutral cities and improved air quality
- **LC-CLA-15-2020**: Forest Fires risk reduction: towards an integrated fire management approach in the E.U.
- **LC-CLA-23-2020**: Towards a comprehensive European mountain research strategy
- **LC-CLA-19-2020**: Integrated GEOSS climate applications to support adaptation and mitigation measures of the Paris Agreement


Call – Competitive, Low-Carbon and Circular Industries
- **CE-SCS-31-2020**: Develop, implement and assess a circular economy oriented product information management system for complex products from cradle to cradle

Public Engagement

Also check the category “Public Engagement & Responsible Research and Innovation”

I. **INDUSTRIAL LEADERSHIP - LEADERSHIP IN ENABLING AND INDUSTRIAL TECHNOLOGIES**

Information and Communication Technologies

Call - Digitising and transforming European industry and services: digital innovation hubs and platforms
- **DT-ICT-05-2020**: Big Data Innovation Hubs

II. **SOCIETAL CHALLENGES**

Societal Challenge 3: Secure, clean and efficient energy

Call – Building a low-carbon, climate resilient future
- **LC-SC3-EC-5-2020**: Supporting public authorities in driving the energy transition
- **LC-SC3-ES-4-2018-2020**: Decarbonising energy systems of geographical Islands
Societal Challenge 4: Smart, green and integrated transport

Call - 2018-2020 Mobility for Growth
- **MG-2-13-2020**: Coordination and support for an integrated freight transport and logistics system
- **MG-4-10-2020**: Improving impact and broadening stakeholder engagement in support of transport research and innovation

Societal Challenge 5: Climate action, environment, resource efficiency and raw materials

Call - Building a low-carbon, climate resilient future: climate action in support of the Paris Agreement
- **LC-CLA-12-2020**: Advancing climate services
- **LC-CLA-21-2020**: Coordination of European Polar research

Call – Greening the economy in line with the Sustainable Development Goals (SDGs)
- **SC5-33-2020**: Monitoring ecosystems through research, innovation and technology

Societal Challenge 6: Europe in a changing world – Inclusive, innovative and reflective societies

Call – Socioeconomic and Cultural Transformations in the Context of the Fourth Industrial Revolution
- **TRANSFORMATIONS-04-2019-2020**: Innovative approaches to urban and regional development through cultural tourism

Call – Governance for the Future
- **SU-GOVERNANCE-09-2020**: Addressing radicalization through social inclusion
- **GOVERNANCE-20-2020**: Centres/Networks of European research and innovation
- **GOVERNANCE-23-2020**: Support to the networking of national R&I Think Tanks for helping co-shape and share a common perspective on R&I policy across Europe

Societal Challenge 7: Secure Societies – Protecting freedom and security of Europe and its Citizens

Call – Protecting the infrastructure of Europe and the people in the European smart cities
- **SU-INFRA01-2018-2019-2020**: Prevention, detection, response and mitigation of combined physical and cyber threats to critical infrastructure in Europe
- **SU-AI01-2020**: Developing a research roadmap regarding Artificial Intelligence in support of Law Enforcement
- **SU-AI03-2020**: Human factors, and ethical, societal, legal and organisational aspects of using Artificial Intelligence in support of Law Enforcement

Call – Security
- **SU-DRS01-2018-2019-2020**: Human factors, and social, societal, and organisational aspects for disaster-resilient societies
SwafS Opportunities

- **SU-FCT03-2018-2019-2020**: Information and data stream management to fight against (cyber)crime and terrorism

**Responsible Research and Innovation (RRI)**

*Also check the category “Public Engagement & Responsible Research and Innovation”*

**I. INDUSTRIAL LEADERSHIP - LEADERSHIP IN ENABLING AND INDUSTRIAL TECHNOLOGIES**

**Nanotechnologies, Advanced Materials, Biotechnology and Advanced Manufacturing and Processing**

**Call – Transforming European Industry**
- **CE-BIOTEC-09-2020**: Upcycling Bio Plastics of food and drinks packaging (RIA)
- **NMBP-21-2020**: Biological scaffolds for tissue regeneration and repair (RIA)

**II. SOCIETAL CHALLENGES**

**Societal Challenge 1: Health, demographic change and wellbeing**

**Call - Better Health and care, economic growth and sustainable health systems**
- **SC1-HCO-18-2020**: Developing methodological approaches for improved clinical investigation and evaluation of high-risk medical devices
- **SC1-BHC-17-2020**: Global Alliance for Chronic Diseases (GACD) - Prevention and/or early diagnosis of cancer
- **SC1-BHC-35-2020**: Creation of a European wide sustainable network for harmonised large-scale clinical research studies for infectious diseases
- **SC1-BHC-24-2020**: Healthcare interventions for the management of the elderly multimorbid patient
- **SC1-HCO-20-2020**: Coordination of clinical research activities of the European Reference Networks
- **SC1-BHC-29-2020**: Innovative actions for improving urban health and wellbeing - addressing environment, climate and socioeconomic factors
- **SC1-HCC-10-2020**: Towards a Health research and innovation Cloud: Capitalising on data sharing initiatives in health research

**Societal Challenge 2: Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bioeconomy**

**Call – Blue Growth**
- **BG-10-2020**: Fisheries in the full ecosystem context

**Call – Rural Renaissance**
- **LC-RUR-11-2019-2020**: Sustainable wood value chains
Call – Food and Natural Resources

- **FNR-01-2020**: Strengthening the European agro-ecological research and innovation ecosystem
- **FNR-03-2020**: A comprehensive vision for urban agriculture
- **FNR-04-2020**: Towards a European research and innovation roadmap on soils and land management
- **CE-FNR-07-2020**: FOOD 2030 - Empowering cities as agents of food system transformation
- **CE-FNR-09-2020**: Pilot action for the removal of marine plastics and litter
- **FNR-16-2020**: Enzymes for more environment-friendly consumer products
- **CE-FNR-14-2020**: Innovative textiles – reinventing fashion

Societal Challenge 3: Secure, clean and efficient energy

Call – Building a low-carbon, climate resilient future

- **LC-SC3-B4E-3-2020**: Upgrading smartness of existing buildings through innovations for legacy equipment
- **LC-SC3-EC-1-2018-2019-2020**: The role of consumers in changing the market through informed decision and collective actions

Societal Challenge 5: Climate action, environment, resource efficiency and raw materials

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

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

Societal Challenge 7: Secure Societies – Protecting freedom and security of Europe and its Citizens

Call – Protecting the infrastructure of Europe and the people in the European smart cities

- **SU-AI02-2020**: Secure and resilient Artificial Intelligence technologies, tools and solutions in support of Law Enforcement and citizen protection, cybersecurity operations and prevention and protection against adversarial Artificial Intelligence

Public Engagement & Responsible Research and Innovation (RRI)

I. **INDUSTRIAL LEADERSHIP - LEADERSHIP IN ENABLING AND INDUSTRIAL TECHNOLOGIES**

Information and Communication Technologies

Call - Information and Communication Technologies

- **ICT-37-2020**: Advancing photonics technologies and application driven photonics components and the innovation ecosystem
- **ICT-46-2020**: Robotics in Application Areas and Coordination & Support
- **ICT-49-2020**: Artificial Intelligence on demand platform
- **ICT-51-2020**: Big Data technologies and extreme-scale analytics
- **ICT-57-2020**: An empowering, inclusive Next Generation Internet

**Call - Digitising and transforming European industry and services: digital innovation hubs and platforms**

- **DT-ICT-03-2020**: I4MS (phase 4) - uptake of digital game changers
- **DT-ICT-09-2020**: Boost rural economies through cross-sector digital service platforms
- **DT-ICT-12-2020**: AI for the smart hospital of the future

**Nanotechnologies, Advanced Materials, Biotechnology and Advanced Manufacturing and Processing**

**Call – Foundations for Tomorrow’s Industry**

- **NMBP-38-2020**: Citizens and industrial technologies (CSA)

**Space**

**Call – Space 2018-2020**

- **DT-SPACE-01-E0-2018-2020**: Copernicus market uptake

**II. SOCIETAL CHALLENGES**

**Societal Challenge 1: Health, demographic change and wellbeing**

**Call - Better Health and care, economic growth and sustainable health systems**

- **SC1-HCO-17-2020**: Coordinating and supporting research on the human microbiome in Europe and beyond
- **SC1-BHC-08-2020**: New interventions for Non-Communicable Diseases
- **SC1-HCO-19-2020**: Reliable and accessible information on cell and gene-based therapies

**Call – Digital transformation in Health and Care**

- **SC1-DTH-02-2020**: Personalised early risk prediction, prevention and intervention based on Artificial Intelligence and Big Data technologies
- **SC1-DTH-04-2020**: International cooperation in smart living environments for ageing people
- **SC1-DTH-12-2020**: Use of Real-World Data to advance research on the management of complex chronic conditions
- **SC1-DTH-13-2020**: Implementation research for scaling up and transfer of innovative solutions involving digital tools for people-centred care
- **SC1-DTH-14-2020**: Pre-commercial Procurement for Digital Health and Care Solutions
- **SC1-HCC-07-2020**: Support for European eHealth Interoperability roadmap for deployment
- **SC1-HCC-09-2020**: Supporting deployment of eHealth in low and lower middle income countries in Africa for better health outcomes
Societal Challenge 2: Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bioeconomy

Call - Sustainable Food Security
- **SFS-04-2019-2020**: Integrated health approaches and alternatives to pesticide use
- **SFS-06-2018-2020**: Stepping up integrated pest management
- **CE-SFS-36-2020**: Diversifying revenue in rural Africa through bio-based solutions

Call – Rural Renaissance
- **RUR-06-2020**: Innovative agri-food value chains: boosting sustainability-oriented competitiveness
- **RUR-07-2020**: Reducing food losses and waste along the agri-food value chain

Call – Food and Natural Resources
- **FNR-08-2020**: Supporting the food safety systems of the future
- **FNR-10-2020**: Public engagement for the Bioeconomy
- **FNR-11-2020**: Prospecting aquatic and terrestrial natural biological resources for biologically active compounds
- **CE-FNR-15-2020**: A network of European bioeconomy clusters to advance bio-based solutions in the primary production sector

Societal Challenge 3: Secure, clean and efficient energy

Call – Building a low-carbon, climate resilient future
- **LC-SC3-B4E-9-2020**: Support to the coordination of European smart buildings innovation community
- **LC-SC3-RES-34-2020**: Demonstration of innovative and sustainable hydropower solutions targeting unexplored small-scale hydropower potential in Central Asia
- **LC-SC3-EC-3-2020**: Consumer engagement and demand response
- **LC-SC3-EC-4-2020**: Socio-economic research: non-energy impacts and behavioural insights on energy efficiency interventions
- **LC-SC3-ES-3-2018-2020**: Integrated local energy systems (Energy islands)
- **LC-SC3-ES-5-2018-2020**: TSO – DSO – Consumer: Large-scale demonstrations of innovative grid services through demand response, storage and small-scale (RES) generation
- **LC-SC3-ES-12-2020**: Integrated local energy systems (Energy islands): International cooperation with India
- **LC-SC3-SCC-1-2018-2019-2020**: Smart Cities and Communities
- **LC-SC3-SCC-2-2020**: Positive Energy Districts and Neighbourhoods for urban energy transitions
- **LC-SC3-CC-1-2018-2019-2020**: Social Sciences and Humanities (SSH) aspects of the Clean-Energy Transition
- **LC-SC3-NZE-6-2020**: Geological Storage Pilots
Other Actions

- **RESponsible Island** - Prize for a renewable geographic energy island

Societal Challenge 4: Smart, green and integrated transport

**Call - 2018-2020 Mobility for Growth**

- **LC-MG-1-12-2020**: Cities as climate-resilient, connected multimodal nodes for smart and clean mobility: new approaches towards demonstrating and testing innovative solutions
- **LC-MG-1-13-2020**: Decarbonising long distance shipping
- **LC-MG-1-14-2020**: Understanding and mitigating the effects on public health of emerging non-regulated nanoparticle emissions issues and noise
- **LC-MG-1-15-2020**: Towards global environmental regulation of supersonic aviation
- **MG-2-10-2020**: Enhancing coordination between Member States’ actions in the area of infrastructure research with a particular focus on biodiversity and ameliorating environmental impacts and full automated infrastructure upgrade and maintenance
- **MG-2-14-2020**: The effects of automation on the transport labour force, future working conditions and skills requirements
- **MG-3-6-2020**: Towards sustainable urban air mobility
- **MG-4-9-2020**: The European mobility culture of tomorrow: Reinventing the wheel?

Societal Challenge 5: Climate action, environment, resource efficiency and raw materials

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

- **LC-CLA-10-2020**: Scientific support to designing mitigation pathways and policies
- **LC-CLA-11-2020**: Innovative nature-based solutions for carbon neutral cities and improved air quality
- **LC-CLA-13-2020**: Climate resilience of European coastal cities and settlements
- **LC-CLA-23-2020**: Towards a comprehensive European mountain research strategy
- **LC-CLA-14-2020**: Understanding climate-water-energy-food nexus and streamlining water-related policies
- **LC-CLA-15-2020**: Forest Fires risk reduction: towards an integrated fire management approach in the E.U.
- **LC-CLA-16-2020**: Multi-hazard risk management for risk-informed decision-making in the E.U.
- **LC-CLA-22-2020**: Enhancing the Belmont Forum Collaborative Research Action on Climate, Environment and Health
- **LC-CLA-20-2020**: Supporting the implementation of GEOSS in the Arctic in collaboration with Copernicus

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

- **CE-SC5-24-2020**: Improving the sorting, separation and recycling of composite and multi-layer materials
• **CE-SC5-25-2020**: Understanding the transition to a circular economy and its implications on the environment, economy and society

• **CE-SC5-28-2020**: Develop and pilot circular systems in plastics, textiles and furniture sectors

• **CE-SC5-30-2020**: Plastics in the environment: understanding the sources, transport, distribution and impacts of plastics pollution


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

• **SC5-26-2020**: Sustainable management in extractive industries

• **SC5-27-2020**: Strengthening international collaboration: enhanced natural treatment solutions for water security and ecological quality in cities

• **SC5-32-2020**: Addressing wild pollinators decline and its effects on biodiversity and ecosystem services

### Societal Challenge 6: Europe in a changing world – Inclusive, innovative and reflective societies

#### Call – Migration

• **MIGRATION-04-2020**: Inclusive and innovative practices for the integration of recently arrived migrants in local communities

• **MIGRATION-05-2018-2020**: Mapping and overcoming integration challenges for migrant children

• **MIGRATION-09-2020**: Narratives on migration and its impact: past and present

#### Call – Socioeconomic and Cultural Transformations in the Context of the Fourth Industrial Revolution

• **DT-TRANSFORMATIONS-02-2018-2019-2020**: Transformative impact of disruptive technologies in public services

#### Call – Governance for the Future

• **DT-GOVERNANCE-12-2019-2020**: Pilot on using the European cloud infrastructure for public administrations

• **SU-GOVERNANCE-21-2020**: Developing deliberative and participatory democracies through experimentation

• **DT-GOVERNANCE-22-2020**: Citizen-centric public services in local and regional administrations

### Work Programme 2018-2020 20. Cross-cutting activities

#### Call – Building a Low-Carbon, Climate Resilient Future: Next-Generation Batteries

• **LC-BAT-15-2020**: Coordinate and support the large scale research initiative on Future Battery Technologies
Call – Competitive, Low-Carbon and Circular Industries

- CE-SC5-31-2020: Develop, implement and assess a circular economy oriented product information management system for complex products from cradle to cradle

Science Communication

I. INDUSTRIAL LEADERSHIP- LEADERSHIP IN ENABLING AND INDUSTRIAL TECHNOLOGIES

Information and Communication Technologies

Call - Information and Communication Technologies

- ICT-46-2020: Robotics in Application Areas and Coordination & Support
- ICT-48-2020: Towards a vibrant European network of AI excellence centres

Call - Digitising and transforming European industry and services: digital innovation hubs and platforms

- DT-ICT-05-2020: Big Data Innovation Hubs

Nanotechnologies, Advanced Materials, Biotechnology and Advanced Manufacturing and Processing

Other Actions

- Educational Materials Set for promoting advanced materials in education

II. SOCIETAL CHALLENGES

Societal Challenge 1: Health, demographic change and wellbeing

Call - Better Health and care, economic growth and sustainable health systems

- SC1-HCO-19-2020: Reliable and accessible information on cell and gene-based therapies
- SC1-BHC-20B-2020: Public procurement of innovative solutions (PPI) for diagnostics for infectious diseases
- SC1-BHC-33-2020: Addressing low vaccine uptake

Call – Digital transformation in Health and Care

- SC1-HCC-09-2020: Supporting deployment of eHealth in low and lower middle income countries in Africa for better health outcomes

Societal Challenge 2: Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bioeconomy

Call – Rural Renaissance

- RUR-07-2020: Reducing food losses and waste along the agri-food value chain

**Call – Food and Natural Resources**

- **FNR-03-2020**: A comprehensive vision for urban agriculture
- **CE-FNR-07-2020**: FOOD 2030 - Empowering cities as agents of food system transformation
- **FNR-08-2020**: Supporting the food safety systems of the future
- **FNR-10-2020**: Public engagement for the Bioeconomy
- **FNR-11-2020**: Prospecting aquatic and terrestrial natural biological resources for biologically active compounds

**Societal Challenge 3: Secure, clean and efficient energy**

**Call – Building a low-carbon, climate resilient future**

- **LC-SC3-EC-4-2020**: Socio-economic research: non-energy impacts and behavioural insights on energy efficiency interventions
- **LC-SC3-EC-5-2020**: Supporting public authorities in driving the energy transition
- **LC-SC3-ES-4-2018-2020**: Decarbonising energy systems of geographical Islands

**Societal Challenge 4: Smart, green and integrated transport**

**Call - 2018-2020 Mobility for Growth**

- **LC-MG-1-15-2020**: Towards global environmental regulation of supersonic aviation
- **MG-2-10-2020**: Enhancing coordination between Member States’ actions in the area of infrastructure research with a particular focus on biodiversity and ameliorating environmental impacts and full automated infrastructure upgrade and maintenance
- **MG-2-13-2020**: Coordination and support for an integrated freight transport and logistics system
- **MG-2-14-2020**: The effects of automation on the transport labour force, future working conditions and skills requirements
- **MG-3-6-2020**: Towards sustainable urban air mobility
- **MG-4-10-2020**: Improving impact and broadening stakeholder engagement in support of transport research and innovation

**Societal Challenge 5: Climate action, environment, resource efficiency and raw materials**

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

- **LC-CLA-11-2020**: Innovative nature-based solutions for carbon neutral cities and improved air quality
- **LC-CLA-15-2020**: Forest Fires risk reduction: towards an integrated fire management approach in the E.U.
- **LC-CLA-21-2020**: Coordination of European Polar research
- **LC-CLA-22-2020**: Enhancing the Belmont Forum Collaborative Research Action on Climate, Environment and Health
Call - **Building a low-carbon, climate resilient future: climate action in support of the Paris Agreement**

- **CE-SC5-07-2018-2019-2020**: Raw materials innovation for the circular economy: sustainable processing, reuse, recycling and recovery schemes
- **SC5-10-2019-2020**: Raw materials innovation actions: exploration and Earth observation in support of sustainable mining
- **SC5-26-2020**: Sustainable management in extractive industries
- **SC5-27-2020**: Strengthening international collaboration: enhanced natural treatment solutions for water security and ecological quality in cities
- **SC5-32-2020**: Addressing wild pollinators decline and its effects on biodiversity and ecosystem services
- **SC5-22-2019**: Assessing and fostering the impacts of Research and Innovation Actions (RIA) and Innovation Actions (IA) granted by Societal Challenge 5 in 2014-2015

### Science Education

#### I. INDUSTRIAL LEADERSHIP - LEADERSHIP IN ENABLING AND INDUSTRIAL TECHNOLOGIES

**Information and Communication Technologies**

**Call - Information and Communication Technologies**

- **ICT-48-2020**: Towards a vibrant European network of AI excellence centres

**Call - Digitising and transforming European industry and services: digital innovation hubs and platforms**

- **DT-ICT-05-2020**: Big Data Innovation Hubs

**Nanotechnologies, Advanced Materials, Biotechnology and Advanced Manufacturing and Processing**

**Call – Foundations for Tomorrow’s Industry**

- **DT-NMBP-40-2020**: Creating an open market place for industrial data (RIA)

**Other Actions**

- **Educational Materials Set** for promoting advanced materials in education
II. **Societal Challenges**

**Societal Challenge 2: Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bioeconomy**

**Call – Blue Growth**
- **BG-11-2020**: Towards a productive, healthy, resilient, sustainable and highly-valued Black Sea

**Call – Rural Renaissance**
- **RUR-05-2020**: Connecting consumers and producers in innovative agri-food supply chains

**Societal Challenge 3: Secure, clean and efficient energy**

**Call – Building a low-carbon, climate resilient future**
- **LC-SC3-ES-4-2018-2020**: Decarbonising energy systems of geographical Islands

**Societal Challenge 4: Smart, green and integrated transport**

**Call - 2018-2020 Mobility for Growth**
- **MG-4-10-2020**: Improving impact and broadening stakeholder engagement in support of transport research and innovation

**Societal Challenge 6: Europe in a changing world – Inclusive, innovative and reflective societies**

**Call – Migration**

**Call – Socioeconomic and Cultural Transformations in the Context of the Fourth Industrial Revolution**
- **TRANSFORMATIONS-18-2020**: Technological transformations, skills and globalization - future challenges for shared prosperity
- **DT-TRANSFORMATIONS-21-2020**: Mentoring scheme for schools: mainstreaming innovation by spreading the advanced ICT-based teaching practices to a wide circle of schools
- **TRANSFORMATIONS-22-2020**: Enhancing access and uptake of education to reverse inequalities
Topics by Horizon 2020 Structure

**Industrial Leadership - Leadership in enabling and industrial technologies**

**Information and Communication Technologies**

**Call - Information and Communication Technologies**

**ICT-37-2020: Advancing photonics technologies and application driven photonics components and the innovation ecosystem**

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<th>SwafS Key Word(s)</th>
<th>Public Engagement, Responsible Research and Innovation (RRI)</th>
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<td>Deadline</td>
<td>22 April 2020 17:00:00 Brussels time</td>
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<td>Topic Information</td>
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**Specific Challenge:** The advancement of photonics depends on core photonics technology which can be applied in many different application areas. The challenge is to develop and apply core photonics technology for the next generation of devices (including components, modules and sub-systems) in order to drive innovation in key application areas, which are significant current or future markets and where photonics can bring a key competitive advantage.

Innovative photonic sensing solutions can contribute to reducing food production losses and food wastes, estimated in Europe at about 300 kg per capita, and to increasing food safety for the end consumer along the food production chain from farm to fork.

Increased pollution of air, soil and water is raising new concerns regarding the safety of the environment and its potential risks for European citizens’ health. *Distributed smart photonic sensor networks involving public participation through community-based monitoring* could assist in creating inventories of emitted pollutants, identifying pollution hotspots, and alerting citizens in real time on potential health risks.

**Scope:** The focus is on the following themes (sub-topics):

a) **Research and Innovation Actions (RIA)**

i. **Flexible Farm-to-Fork Sensing:** Development of an innovative smart photonic sensor solution, utilizing an appropriate bandwidth between the ultraviolet (UV) and the far infrared spectral range for monitoring food quality with respect to microbiological and chemical contamination along the farm-to-fork food production chain. The targeted solution should combine photonic sensing technology with advanced data analysis techniques and be portable, easy-to-use, flexible, and broadly adaptable for usage on farms, in food processing, wholesale and retail. Actions should focus on the following areas: (1) food production by small/medium-sized farms; (2) novel types of food production, such as aquaponics; (3) on-site food processing and vending (e.g. on farms or local food markets). The developed solution must be demonstrated in real settings involving relevant stakeholders along the food supply chain, from food producers to end consumers.
ii. **Novel Photonics Integrated Circuit (PIC) Technology building blocks**: Major advances in photonic integrated circuit technology through the development of building blocks with significantly enhanced or novel functions. These should form part of comprehensive integration platforms for established or new important application fields, enabling the platform to meet the demands of application roadmaps concerning relevant features like sensitivity, energy efficiency, speed and chip density. Developments should be based on a generic platform approach, i.e. support the single-chip integration of complex functions through a design flow based on generic building blocks separated from production. Actions should include a validation of results with fabricated PIC prototypes.

b) **Innovation Actions (IA)**

iii. **Smart Photonic Sensing for Environmental Pollution Detection**: Prototyping, demonstration and validation in real settings of an innovative, cost-effective, portable, smart hyperspectral sensing system operating in the visible to mid-infrared spectral range, for pollution detection in environmental sensing applications. The system should be based on a miniaturised optical setup and feature broad sensorial response curves with high measurement precision in the diagnostic wavelength range, in combination with massive Cloud-based data analysis capability using advanced Deep Learning algorithms and Big Data sensor signal repositories for comprehensive chemometric analysis.

c) **Coordination and Support Actions**

iv. **An industrial strategy for photonics in Europe**: the objective is to support the development and implementation of a comprehensive industrial strategy for photonics in Europe which strengthens the links to the end user industries. The action should include the development of strategic technology road-maps, strong stakeholder engagement (in particular Photonics21 stakeholders, National Technology Platforms, regional Clusters, end-user industries), coordination of regional, national and European strategies and priorities, and development and dissemination of financing models to facilitate access by companies to different sources of finance.

To ensure domain coverage, at least one proposal will be selected to cover each of these themes. As it is necessary to coordinate strategy efforts singly, no more than one action will be funded for theme iv).

The Commission considers that proposals requesting a contribution from the EU between EUR 3 and 5 million for themes i and ii; EUR 4 and 7 million for theme iii, and up to EUR 4 million for theme iv would allow these to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

**Expected Impact**: Proposals should describe how the proposed work will contribute to the relevant expected impacts and metrics, including a baseline and the targets to measure impact. Respectively:

1. Increased food yield, quality and safety, and significant reduction of food waste along the farm-to-fork food production chain with cost-effective and easy-to-use analysis and quality-control tools;
2. Strengthening small/medium-scale farming and local or novel ways of food production and processing by ensuring high food quality standards at lower resource usage and competitive costs.

ii. Reduction of the research and development costs of advanced PICs in a wide range of application areas.

iii. Large-scale adoption of affordable, Cloud-connected, smart photonic sensing systems for pervasive, Community-based environmental pollution monitoring and real-time citizen alert on local pollution levels and related health risks.

iv. 1. Reinforced value chains and deployment of photonics technologies by stronger cooperation of photonics stakeholders, clusters and end-users;

2. Increased competitiveness of the European photonics sector and improved access to risk finance for the photonics sector in Europe.

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

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

**ICT-38-2020: Artificial intelligence for manufacturing**

<table>
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<th>SwafS Key Word(s)</th>
<th>Ethics</th>
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<tr>
<td>Deadline</td>
<td>16 January 2020 17:00:00 Brussels time</td>
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<td>Topic Information</td>
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**Specific Challenge:** State-of-the-art AI technologies need to be integrated with advanced manufacturing technologies and systems in order to exploit their potential in manufacturing and process industry. AI systems cooperating with humans can improve production planning and execution, and can help to improve quality of products and processes. To widely deploy these technologies, specific attention has to be given to standardisation, synchronising EU and Member States activities, and to international collaboration.

**Scope:**

**a) Research and Innovation Actions (RIA)**

The focus is on integrating state-of-the-art AI technologies in the manufacturing domain, for example in agile production processes and predictive quality, taking into account the domain-specific requirements in terms of time criticality, safety and security, finding effective ways for collaboration between humans and AI systems, and exploiting the strengths of both humans and machines while keeping the human in control. **Ethical principles, as expressed by the high-level expert group on Artificial Intelligence 12 should be followed and recommendations for instantiation in the manufacturing domain should be developed.** Proposers are encouraged to build on existing results from artificial intelligence research, for example ICT-26-2018-2020.

Proposals must develop innovative concepts and tools that take into account the status and availability of all relevant production resources, learn from past experiences, and deal
effectively with unforeseen events. If appropriate, AI techniques should be combined with
digital twins and real-life feedback from the shop floor or production facility to improve
quality of products and processes. Generative design approaches for products and processes
are encouraged.

Developed technologies and solutions should be demonstrated in at least two different
realistic manufacturing use cases of significant economic value. If applicable, legal obstacles
to implementation of the proposed solutions should be identified.

The Commission considers that proposals requesting a contribution from the EU of between
EUR 4 and 6 million would allow this area to be addressed appropriately. Nonetheless, this
does not preclude submission and selection of proposals requesting other amounts.

b) Coordination and Support Actions (CSA) Standardisation
Proposals are expected to extend, further develop, and support the implementation of a
model for the synchronisation of standardisation activities on AI and related digital
technologies in manufacturing at large, at the Member State level and at the European level –
and in a global context, taking into account legal and ethical issues where relevant.
Proposals need to build on previous activities, such as the results of the Joint MSP/DEI
Working Group on standardisation in support of Digitising European Industry.

Cooperation EU-Japan

Proposals are expected to support possible cooperation with Japan, in areas relevant for AI-
driven innovation in manufacturing and digital industrial platforms. Proposals will assess
opportunities, and kick-off cooperation activities, by organising contacts between
researchers and companies from EU and Japan working on AI applications for
manufacturing, encouraging the exchange of information on the respective research
programmes and technological results. Proposals shall foresee twinning with entities
participating in projects funded by Japan to exchange knowledge and experience, exploit
synergies and develop recommendations for further sustainable cooperation and
collaboration activities.

The Commission considers that proposals requesting a contribution from the EU of EUR 0.5
million would allow these areas to be addressed appropriately. Nonetheless, this does not
preclude submission and selection of proposals requesting other amounts. One coordination
and support action will be supported for each of the two areas above.

Expected Impact: Research and Innovation Actions

- Products and services usable in a wide range of manufacturing processes leading to
  agile production processes and improved quality of products and processes
- Humans working together with Artificial Intelligence systems in optimal complementarity

Coordination and Support Actions
• Increased synchronisation and cooperation on AI and related digital technologies in manufacturing, with higher global impact

Proposals need to describe how the proposed work will contribute to the impact criteria above, provide metrics, the baseline and targets to measure impact.

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

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

**ICT-46-2020: Robotics in Application Areas and Coordination & Support**

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**Specific Challenge:** While robots originated in large-scale mass manufacturing, they are now spreading to more and more application areas. In these new settings, robots are often faced with new technical and non-technical challenges. The purpose of this topic is to address such issues in a modular and open way, and reduce the barriers that prevent a more widespread adoption of robots. Four Priority Areas (PAs) are targeted: healthcare, inspection and maintenance of infrastructure, agri-food, and agile production.

In each of these PAs it is critical to develop appropriate autonomous capability that has impact on the efficiency of key applications in the PAs and moves beyond the current state of the art. This capability is built from core technologies and is proved and tested through pilot demonstrators that embed within real or near real environments.

**User needs, safety, ethical, gender, legal, societal and economic aspects should be addressed in order to raise awareness and take-up by citizens and businesses. Privacy and cybersecurity issues, including security by design and data integrity should also be addressed, where appropriate.**

**Scope:** a) Research and Innovation Actions (RIA) - Robotics Core Technology

Autonomy in robotic systems is built on a combination of four Core Technologies: AI and Cognition: AI provides tools to make systems cognitive. Cognition equips robots with the ability to safely interact with people, their environments or other robots, to learn and to categorise, to make decisions and to derive knowledge.

Cognitive Mechatronics: Mechatronic systems where sensing and actuation are closely coupled with cognitive systems are expected to deliver improved control, motion, interaction (including all modalities), adaptation and learning, and safer systems.

Socially cooperative human-robot interaction: Cooperative human-robot interaction is
SwafS Opportunities

critical in many work environments from collaborative support, e.g. passing tools to a worker, navigation in complex work environments, human-friendly and human assistive interactions, to the design of exo-skeletons able to provide motion that is sympathetic to the user. Model-based design and configuration tools: Deploying robotics at scale in application areas where tasks need to be defined by the user requires easy-to-use configuration tools. Embedding and sharing of knowledge between tools is essential, as is standardisation across the interfaces to connect systems and modules (taking into account cybersecurity issues including security by design and data integrity).

Proposals should address one of the four core technologies and target the development of core technology modules (modular, open and non-proprietary) and tool kits for use in deployable system platforms that meet the requirements of applications in the following four prioritised application areas: Healthcare, Infrastructure Inspection and Maintenance, Agri-Food and Agile Production. Proposals will be required to dedicate resource for connecting with the DIH actions arising from DT-ICT-02-2018.

The Commission considers that proposals requesting a contribution from the EU of between EUR 6 and 7 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Proposals are requested to specify the Core Technology in which their centre of gravity lies. At least one action in each Core Technology will be funded.

b) Innovation Actions (IA) - Robotics for agri-food, and agile production

Establish large-scale pilots capable of demonstrating the use of robotics at scale in actual or highly realistic operating environments; showcase advanced prototype applications built around platforms operating in real or near-real environments and demonstrate high levels of socio-economic impact.

Through large-scale pilots, proposals are expected to make a significant step forward in platform development in one of the two application areas:
- In the Agri-Food sector from farming to processing and distribution
- Agile Production.

Starting from suitable reference architectures, platform interfaces are defined, tested via piloting, and supported via ecosystem building preparing their roll-out, and are being evolved over time into standards.

Each proposal is expected to establish large scale pilots. They are expected to: consider utilising existing infrastructure and links to other European, national or private funding sources; identify the long-term sustainability of the pilot; develop scalable technical solutions capable of meeting performance targets; develop metrics and performance measures for the pilot; engage relevant industry stakeholders, including SMEs, in the provision and operation of the pilot, paving the way towards establishing strong collaborations for innovative robotic applications in industry. Proposals will be expected to dedicate resources to disseminate best practice and coordinate access to platforms and demonstrators, in particular in connecting with the Robotics DIHs and Core Technologies actions and other relevant activities, in H2020 and beyond.
Pilots are expected to address both technical and non-technical issues, such as socio-economic impact, novel business models, legal and regulatory, ethical and cyber-security issues and connections to AI, Big Data and IoT. Where appropriate, applications should leverage synergies among EU satellite-based systems for navigation (EGNOS/Galileo), and/or observation (Copernicus) and communication.

The Commission considers that proposals requesting a contribution from the EU of between EUR 6 and 7 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. The objective is to fund at least 3 proposals per application area.

c) Coordination and Support Action (CSA) - Robotics

Proposals should address issues concerning the whole European robotics community and provide support actions that develop awareness and knowledge transfer. Proposals should consider the development of a high-level stakeholder forum and an associated communication strategy; the development of mechanisms that create a continuing discussion around legal and societal issues concerning AI-based robotics technology that leads to strategic development and the dissemination of best practice to robotics stakeholders and particularly to developers and policy makers.

Proposals should address the issues of socio-economic analysis, cyber-security, data protection, ethical and privacy issues that arise from the increased deployment of robotics to ensure that there is relevant and effective strategic development and best practice advice available to robotics stakeholders.

Proposals should address the public understanding of robotics through the development of news articles, public and media engagement and awareness activities.

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

Expected Impact: Research and Innovation Actions:
- Improved technical capability in each of the core technologies over the current state of the art.
- A greater range of applications in the prioritised application areas that can be demonstrated at TRL 3 and above.
- The lowering of technical barriers within the prioritised applications areas.

Innovation Actions:
- Demonstration of the potential for robotics to impact at scale in the chosen application areas prioritised in this call.
- Reduction of technical and commercial risk in the deployment of services based on robotic actors within the selected application area.
- Greater understanding from the application stakeholders of the potential for deploying robotics.
- Demonstration of platforms operating over extended time periods in near realistic
environments and promotion of their use.
- Develop the eco-system around the prioritised application areas to stimulate deployment.
- Contribution to the development of open, industry-led or de facto standards

Coordination and Support Action:
- Effective dissemination of knowledge surrounding non-technical aspects of robot deployment.
- Greater awareness of robotics among key stakeholders and policy makers.
- Improved understanding of legal, socio-economic and ethical issues and their impact on robotics deployment.

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

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

**ICT-47-2020: Research and Innovation boosting promising robotics applications**

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**Specific Challenge**: Robotics enables a significant part of the economic impact of AI by delivering physical intelligence. Logistics, Healthcare, Agri-Food, Inspection and Maintenance, Mobility, Construction, Decommissioning; all require physical intelligence, for example in object manipulation. Physical intelligence is derived from combinations of underlying functional capabilities and developing these capabilities beyond the state of the art depends on fundamental R&D&I which crosses between technical domains, for example into materials research or human interaction. It is therefore important to enhance the capability of robots by exploring and developing the opportunities offered by novel technical developments related to physical intelligence.

**Scope**: Innovative approaches to hard research problems in relation to applications of robotics in promising new areas are particularly encouraged. Proposals are expected to enable substantially improved solutions to challenging technical issues, with a view of take-up in applications with high socio-economic impact and low environmental footprint, where appropriate. Driven by application needs, the work can start from research at low TRL, but proposals are expected to validate their results in sufficiently realistic scenarios in order to demonstrate the potential for take-up in the selected application(s).

The call is open to the following research areas:
I. Development of autonomous robots at the micro- or millimetre scale capable of energy autonomy on the scale of hours or longer. Developing miniature robots is challenging and the potential of robotics at this scale has not been fully explored.

II. Integration and use of novel materials for service robotics, for instance active materials (e.g.: soft grippers). Current materials often limit the capability of robots, an exploration of how novel materials can reshape robots is an important innovation. In addition, material enabling the design of easy to maintain, upgrade and recycle robots, would also be an important innovation.

III. Beyond human speed, general purpose, dexterous manipulation of objects. Raising productivity in many processes will require robots to operate faster than humans in the same task.

IV. Application and integration of non-visual sensing novel for service robotics (including off-board, ambient and multi-scale sensing) to achieve new functionality. Many applications in service robotics need sense data beyond the visual; for example chemical, biological, and physical properties; integrating these non-visual data into interpretation and decision making can enhance tasks by taking them beyond human sensing limitations.

V. Development of intrinsically safe physical powerful robotic systems with proximity sensing capability for human-scale collaborative tasks. Developing intrinsically safe systems is critical to the uptake of collaborative robotics where robots need to be capable of applying working forces that can potentially cause injury to humans.

VI. Development of variable autonomy systems that significantly extend and enhance the operator’s awareness of the working environment. Sharing autonomy between a human operator and a robot can speed up operations and raise productivity.

Proposals are expected to be inspired by, and demonstrate the capability to address, real end user needs, respecting ethical, legal and social aspects, as appropriate. Proposals will be expected to plan efforts to connect and cooperate with the DIHs, Platforms and other relevant activities of this work programme, as appropriate. Proposals will be expected to deliver integrated TRL 4 demonstrations that show step change performance improvement over the current state of the art in the chosen area.

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

Expected Impact:

- Strengthening European excellence in Robotics S&T
- Boosting the use of robotics in promising application areas
- Opening up new markets for robotics
- Lowering barriers in the deployment of robotics-based solutions.

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.*
**ICT-48-2020: Towards a vibrant European network of AI excellence centres**

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**Specific Challenge:** To ensure European strategic autonomy in such critical technology as AI, underpinning most of our future professional and private activities, with huge potential socioeconomic impact, it is essential to reinforce and build on Europe’s assets in AI, including its world-class researcher community, in order to stay at the forefront of AI developments. As stated in the communication from the European Commission on Artificial Intelligence for Europe and the coordinated action plan between the European Commission and the Member States, while Europe has undeniable strengths with its many leading research centres, efforts are scattered. Therefore joining forces will be crucial to be competitive at international level.

Europe has to scale up existing research capacities and reach a critical mass through tighter networks of European AI excellence centres. The objective is to foster cooperation among the best research teams in Europe, joining forces to tackle more efficiently major scientific and technological challenges in AI hampering deployment of AI-based solutions.

**Scope:** a) **Research and Innovation Actions (RIA)**

As announced in the Communication on Artificial Intelligence for Europe, the Commission will invest in strengthening AI research excellence centres across Europe and facilitate their collaboration and networking. The objective of this action is to develop networks of excellence centres aiming at boosting the research capacity in Europe and the status of Europe as a research powerhouse for AI, and making it attractive for scientists and new talents. This initiative is also expected to contribute to the development of ethical and trustworthy Artificial Intelligence, the trademark for AI “made in Europe”.

Such networks are expected to mobilise researchers to collaborate on key AI topics, to reach critical mass on these topics and to increase the impact of the funding in progressing faster in joined efforts rather than working in isolation, with fragmented and duplicated efforts.

Objectives of the Networks:

Up to four networks will be selected, focusing on scientific or technological major challenges, with the primary goal to reinforce Europe’s capacity and progress in critical technologies.

- In addition, building on existing efforts by the AI-on-demand platform and in cooperation with the coordination and support action of this topic, these networks will develop mechanisms to spread the latest and most advanced knowledge to all the AI-labs in Europe and prepare the next generation of talent in AI. Such mechanisms will have to be defined in the proposal.

- Another objective is also to develop synergies and cross-fertilization between industry and these networks of excellence centres, in particular through internships of academic staff (at all levels) in industry, or PhD programmes with industry.

- The set of networks will form a common resource and will become shared facility, as a virtual laboratory offering access to knowledge and expertise and attracting the
talents. It should become a reference, creating an easy entry point to AI excellence in Europe and should also be instrumental for its visibility.

Composition of the Networks:
- Each network should be driven by leading figures in AI from major excellent research centers, bringing the best scientists distributed all over Europe. They will bring on board the necessary level of expertise and variety of disciplines and profiles to achieve their objectives.
- Industrial participation will be ensured through industrial research teams and also in bringing expertise to identify important technological limitations hampering deployment in industrial context. Such industrial involvement will thus help defining the research priorities of the network and will raise new research questions.
- Each network will have to demonstrate access to the required resources and infrastructure to support R&D, such as data, HPC (central, GPUs, edge computing), storage, robotics equipment, IoT infrastructure, support staff and engineers to develop experiments, etc. All available data sources, including Copernicus data where relevant, should be made use of.

Activities of the Networks: for each of the following activities, the most appropriate mechanisms should be selected and detailed in the proposal:
- In order to structure the activities, the proposals will focus on important scientific or technological challenges with industrial relevance and where Europe will make a difference, either in building on strengths, or strengthening knowledge to fill gaps critical for Europe.
- Based on these challenges, the networks will develop and implement common research agendas. The main vision and roadmap with targets within the projects, as well as methodology to implement and monitor progress will have to be specified in the proposal and can be further developed during the project.
- Progress will be demonstrated in the context of use-cases, also helping to foster industry academia collaboration.
- Strong links will be developed among the members of the networks, notably through collaborative projects, exchange programmes, or other mechanisms to be defined by the consortia.
- The proposals should define mechanisms to foster excellence, to increase efficiency of collaboration, and to develop a vibrant AI network in Europe.
- Each network will disseminate the latest and most advanced knowledge to all the academic and industrial AI laboratories in Europe, and involving them in collaborative projects/exchange programmes. (This could involve projects defined initially or via financial support to third parties, for maximum 20% of the requested EU contribution).
- Each network will develop interactions with the industry (inside the consortium and beyond), in view of triggering new scientific questions and fostering take-up of scientific advances.
- Each network will develop collaboration with the relevant Digital innovation Hubs, to disseminate knowledge and tools, and understand their needs.
- **Proposals will include common academic/industrial PhD programmes and post-PhD programmes** with a focus on industrial challenges. The ambition is to establish a unique and world-recognised brand for a European programme for industrially-
oriented PhDs in AI and to keep researchers in Europe after they complete their PhDs.
- These networks should also foster innovation and include mechanisms to exploit new ideas coming out of the network’s work (for instance via incubators).
- Overall, each proposal will define mechanisms to become a virtual center of excellence, offering access to knowledge and serve as a reference in their chosen specific field, including activities to ensure visibility.

Technology focus:
Collaborative projects carried out in networks should focus on one or several of the following topics and would involve the necessary competencies available in the network to address these:
- Advances in foundations of AI (e.g.: learning and reasoning approaches) and approaches for trusted AI solutions (including explainable AI, unbiased AI, safety, reliability, verifiability etc.),
- Developing the next generation of intelligent robots,
- Advanced perception or interaction with humans (for human-centered AI) and environments, AI at the edge and hardware for AI.

Synergies with the AI-on-Demand platform:
The AI-on-demand platform should serve as the backbone of these networks in:
- Providing tools and algorithms, data, support services, also to the research community;
- Establishing the link to the community at large in order to spread the knowledge and develop collaborations.

The networks will aim at strengthening the AI-on-Demand-platform in enriching its capacity in terms of tools, competencies, services, to make it the reference and quality label for resource in AI. Being the one-stop-shop for AI resource in Europe, the tools, algorithms, resources developed in the networks of excellent centres will be made available to all via the AI-on-Demand platform.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 12 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

b) Coordination and Support Action (CSA)
The coordination and support action will help develop synergies and exchange between the selected projects, and with other relevant projects, such as the AI-on-demand platform, and the community at large, both academic and industrial. It will support the running projects in allowing economies of scales regarding common activities run by the individual networks (e.g.: organization of events, logistics support for calls for FSTP, exchange mechanisms among labs, etc.), exchanges of best practices to reinforce and optimize cooperation, etc. It is also expected to support the RIA projects in their dissemination activities towards industry, users, and citizens. Diversity and gender aspects should be addressed, when relevant.

In addition, due to the importance of equipping the professionals with the right skills in order to maximise the benefits offered by AI-based system, this action will support the
academia, in cooperation with industry, via organisation of workshops, and other appropriate approaches, to identify AI courses and modules that could be integrated in non-ICT education master programmes, and corresponding mechanisms to foster such integration.

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

**Expected Impact:**
- Make Europe a research powerhouse for AI;
- Increase Europe’s attractiveness for scientists, so that it notably becomes the nest for future generations of scientists and breakthrough in AI;
- Ensure Europe’s leadership in key strategic research topics,
- Strengthen the AI-on-Demand platform with algorithms, tools solutions developed by the actions funded under this topic;
- Foster mobilization and commitment from the community, including high level experts to contributing to the AI-on-Demand platform, making it the reference resource for European researchers, developers, integrators and users;
- Reinforce Europe’s research capacity in AI;
- Pave the way to enrich the education offer in order to equip a broad range of non-ICT professionals with the necessary AI skills, to make the best of this technology.

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

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

**ICT-49-2020: Artificial Intelligence on demand platform**

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**Specific Challenge:** The challenge is to fully exploit the potential of AI in the economy and society. Building notably on Europe’s Scientific and Technology strengths in the field, the supported activities should reinforce industrial competitiveness across all sectors including for SMEs and non-tech industries and help address societal challenges (e.g. ageing, transport, gender equality). The ambition is to bring AI technologies and resources to integrators and innovators in all sectors and actively engage with a wide user community, to foster adoption of AI, via use-cases experiments.

**AI-on-demand platform: consolidation and exploitation**

**Scope:** This topic builds on the AI-on-demand-platform funded in ICT26-2018-20, a reference access point gathering and providing access to AI-related knowledge, algorithms
and tools and access to related infrastructures, equipment, and data resources, offering also experts support to potential users of AI in order to facilitate the integration of AI into applications, making it a compelling solution for users, especially from non-tech sectors. This activity aims at consolidating the eco-system by bringing in a larger user community, especially from the non-tech sector, and by reinforcing the service layer of the platform. At this stage, it will be particularly important to refine mechanisms to ensure the platform’s longterm sustainability. The platform should provide a good European coverage, both in terms origin of the resources made available on the platform, but also in terms of users of the platform, making sure its resource is available everywhere in Europe.

The objectives:
- Reinforce the service layer of the AI-on-demand-platform funded in ICT26-2018-20 to facilitate the use and uptake of the platform resources.
- Reaching out to new user domains and boosting the use of the platform through use cases and small-scale experiments. The task will involve financial support to third parties, in line with the conditions set out in part K of the General Annexes. Minimum EUR 2 million funding should be dedicated to it, with EUR 50.000 to 200.000 per third party (amount higher than EUR 60.000 should be justified, based on need of expensive hardware or infrastructure for instance). The selection process should prioritise projects maximising the impact of the platform and demonstrating the benefit of AI in products, processes or services. Particular attention will be paid to SMEs and low-tech sector, which can best benefit from the support offered by the platform. The selected projects should also cover a wide spread of application sectors, to demonstrate the versatility and scalability of the platform offer.

Proposals will ensure continuity with the project selected under ICT26-2018-20, having access to all the knowledge and offer needed to fully exploit it and be able to build on it. The improvements resulting from the selected projects should be made available and open to the community via the platform, to allow full exploitation, and also further developments by entities outside the consortia, building on these results.

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

Expected Impact:
- Enriching and optimising the AI on-demand platform service offer and reinforcing its sustainability
- Boosting the deployment of AI-based solutions and services, enabling a larger user community to reap the economic benefits of AI, especially SMEs and non-technology sectors

Type of Action: Innovation action

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*
ICT-51-2020: Big Data technologies and extreme-scale analytics

SwafS Key Word(s) | Public Engagement, Responsible Research and Innovation (RRI)
---|---
Deadline | 16 January 2020 17:00:00 Brussels time
Topic Information | Link

**Specific Challenge:** Rapidly increasing volumes of diverse data from distributed sources create challenges for extracting valuable knowledge and commercial value from data but at the same time have huge potential towards more accurate predictions, better analytics and responsible AI. This calls for novel methods, approaches and engineering paradigms in machine learning, analytics and data management. As the success will require not only efficient data processing/management but also sufficient computing capacity and connectivity, a coordinated action with the appropriate technology areas (e.g. AI, analytics, software engineering, HPC, Cloud technologies, IoT and edge/fog/ubiquitous computing) is necessary and will contribute to a European leadership in these areas.

All grants under this topic will be subject to Article 30.3 of the grant agreement (Commission right to object to transfers or licensing).

**Scope:**

a) **Research and Innovation Actions (RIA)**
Developing new methodologies and engineering solutions addressing industrial and/or societal challenges. Proposals should cover at least one of the following technology areas (but may additionally cover others): machine learning/deep learning (especially on distributed data sets), architectures for collecting, managing and exploiting vast amounts of data; system engineering/tools to contribute to the co-design of federated/distributed systems (to involve all stakeholders/technology areas); new methods for extreme-scale analytics, deep analysis, precise predictions and automated decision-making; novel visualization techniques; data fusion and data integration technologies; standardized interconnection methods for efficient sharing of heterogeneous data pools, seamlessly using distributed tools and services.

The data assets must be sufficiently large, realistic, available to the project and described in the proposal. The Commission considers that proposals requesting a contribution from the EU of between EUR 3 and 6 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

b) **Coordination and Support Action (CSA)**
To ensure coordination between the different existing and emerging activities in HPC/BD/Cloud/AI technologies, including Public-Private Partnerships, digital innovation hubs, and relevant national and regional initiatives, in particular the European Network of National Big Data Centres of Excellence. This action is expected to support the transition towards the activities in the Horizon Europe programme.
The Commission considers that proposals requesting a contribution from the EU of EUR 1.5 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

a) Research and Innovation Actions

- Increased productivity and quality of system design and software development thanks to better methods, architectures and tools for complex federated/distributed systems handling extremely large volumes and streams of data;
- Demonstrated, significant increase of speed of data throughput and access, as measured against relevant, industry-validated benchmarks;
- Demonstrated adoption of results of the extreme-scale analysis and prediction in decision-making, including AI (in industry and/or society)

b) Coordination and Support Action

- Effective cooperation of the participating initiatives and platforms as measured by the jointly participating relevant members/users, countries/regions/cities and projects, and the organisation of common events and joint initiatives, resulting in an increased prevalence of data value chains and related technologies (HPC/BD/Cloud/IoT/AI) in the national and regional strategies.
- Smooth transition to Horizon Europe activities.

**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.

**ICT-54-2020: Blockchain for the Next Generation Internet**

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**Specific Challenge:** The Next Generation Internet initiative aims at developing a more human-centric Internet supporting values of openness, decentralisation, inclusiveness and protection of privacy and giving the control back to the end-users, in particular of their data. It should provide more transparent and accessible services, more intelligence, greater involvement and participation, leading towards an Internet that is a true engine of growth and social progress.

Blockchain and distributed ledger technologies (DLT) have the potential to enable more decentralised, trusted, user-centric digital services, and stimulate new business models benefiting society and the economy as stressed by the European Parliament resolution on the topic. These technologies will create opportunities to enhance services and processes in
both the public and private sectors, notably providing better control of data by citizens and organisations, reducing fraud, improving recordkeeping, access, transparency and auditability, within and across borders. As a key component of the Next Generation Internet initiative, the specific challenge is to foster research and innovation at technology, infrastructure and application levels to position Europe at the forefront of the blockchain revolution.

This topic contributes to the European Commission strategy on blockchain. The first milestones of this strategy were the launch of the European Blockchain Observatory and Forum, which aims to accelerate blockchain innovation and the development of the blockchain ecosystem within the EU, and the European Blockchain Partnership, signed by 26 Member States and Norway, to cooperate in the establishment of a European Blockchain Services Infrastructure.

The Research and Innovation Actions mentioned below are complemented by a blockchain pre-commercial procurement action, which is presented under the “Other actions” part of the Work Programme.

**Scope:** Research and Innovation Actions (RIA) will be called for in the following three sub-topics. Proposals should address only one of these sub-topics.

1. **Advancing research on Blockchain and Distributed Ledger Technologies**

Conducting research, proofs of concepts, piloting, testing and benchmarks to improve and further develop advanced blockchain technologies, for example regarding energy efficiency and sustainability, consensus protocols, a priori usage control, scalability and throughput, security, privacy, robustness, interoperability, cryptography, smart contracts, governance, compliance to regulatory frameworks. This action should contribute to standardisation activities.

2. **Fostering trust in internet information exchange and content with blockchain**

Develop decentralised blockchain-based solutions that can be scaled in a sustainable manner, combined with the use of trustworthy electronic identification, authentication and verified pseudonyms, to preserve the integrity and reliability of information and content, including the underlying sources, on the internet. Two use cases: a) develop and implement new transparent and accountable reputation-based models to increase trustworthiness of the information exchange on the internet and social networks and b) provide solutions for transparency, trustworthy transactional content handling, on the internet and social networks.

3. **Bringing forward the emergence of collective intelligence on the internet:**

Develop approaches for scientific understanding and technology-based stimulation of collective intelligence on social media and the internet to foster trustworthy knowledge and information sharing, and to enhance social inclusion. Two use cases: a) develop new community-based service models on social networks that exploit collective intelligence to provide enhanced community services, and increase the availability of trustworthy content.
and b) in the context of collective intelligence develop and implement new concepts for connecting people and smart objects/agents/AI on social media. Approaches for both use cases must be rooted in scientific analysis of collective behaviour (taking into account gender difference, where relevant) and network mechanisms, harness decentralised technologies such as P2P or blockchain for governance and support a dependable collective memory.

Each RIA in the three sub-topics above, through an agile and flexible process, will support third party projects from outstanding academic research groups, hi-tech startups, SMEs and other multidisciplinary actors, so that multiple third parties will be funded in parallel contributing to the research and innovation area. The RIA will provide the programme logic and vision for the third-party projects, ensure the coherence and coordination of these projects, provide the necessary technical support, as well as coaching and mentoring, in order that the collection of third party projects contributes towards a significant advancement and impact in the research domain. The focus will be on applied research that is linked to relevant use cases and that can be further developed into viable solutions. Apps and services that innovate without a research component are not covered by this model.

Beneficiaries shall make explicit the intervention logic for their specific sub-topic, their capacity to attract relevant top talents, to deliver a solid value-adding services package to the third-party projects, as well as their expertise and capacity in managing the full life-cycle of the open calls transparently. They should explore synergies with other research and innovation actions, supported at regional, national or European level, to increase the overall impact.

RIAs should encourage open source software and open hardware design, open access to data, standardisation activities, access to testing and operational infrastructure as well as an IPR regime ensuring lasting impact and reusability of results.

For grants awarded under this topic for Research and Innovation actions beneficiaries may provide support to third parties as described in part K of the General Annexes of the Work Programme. The support to third parties can only be provided in the form of grants. The respective options of Article 15.1 and Article 15.3 of the Model Grant Agreement will be applied.

The Commission considers that proposals with an overall duration of 24 to 36 months and requesting a contribution from the EU of EUR 8 million for sub-topic i); and EUR 6 million for each sub-topic ii) and iii) would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other durations or amounts. As the primary purpose of the action is to support and mobilise internet innovators, a minimum of 70% of the total requested EU contribution should be allocated to financial support to the third parties. For ensuring focused effort, third parties will be funded through projects typically in the EUR 50 000 to 200 000 range per project, with indicative duration of 12 months. In line with Article 23 (7) of the Rules for Participation, the amounts referred to in Article 204-205 of the Financial Regulation may be exceeded in order to achieve the objective of the action up to a maximum funding per third party of EUR 500 000.

Expected Impact: Proposals should provide appropriate metrics for the claimed impacts.
• Shape a more human-centric evolution of the Internet.
• For sub-topic i): Reinforcing the European Blockchain ecosystem and excellence in research.
• For sub-topic ii): Scalable blockchain based solutions for ensuring trustworthy content and information exchange
• For sub-topic iii): Service models for community services building on collective intelligence and novel approaches for connecting people and smart objects/agents to stimulate use of collective intelligence
• Promoting interoperability and strengthening the role of Europe in international standardisation.
• Create a European blockchain ecosystem integrating research and innovation communities.
• Generate new business opportunities and new Internet companies with maximum growth and impact chances.

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.

ICT-57-2020: An empowering, inclusive Next Generation Internet

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Specific Challenge: As the digital transformation of society accelerates, the use of mobile devices and applications can significantly improve the daily life of citizens. Leveraging on multidisciplinary expertise drawing on knowledge from both the technological and human sciences, novel technologies, such as automatic translation as well as speech and sign recognition and synthesis, could offer inclusive human-centric solutions facilitating communication between people with and without hearing impairments.

Scope: Develop novel mobile applications translating between speech and sign languages to assist people with hearing impairments. The projects should leverage on current state-of-the-art in translation between all official spoken and sign languages of the EU Member States and associated countries for efficient and effective use on mobile devices. Projects should explore how end-users can best interact and cooperate with the application and how the system adapts to users in real-life conditions and prevents unintended gender bias in translation. The resulting applications should be open source, robust, cost-effective and validated across a wide spectrum of users. Priority will be given to projects addressing a wide range of languages, in particular under-resourced languages.
The Commission considers that proposals requesting a contribution from the EU between EUR 2 and 4 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

**Expected Impact:**

- Improve multilingual speech processing and sign language detection on mobile devices, and deploy solutions allowing wide take up by people with hearing impairments.

**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.*

**Call - Digitising and transforming European industry and services: digital innovation hubs and platforms**

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**Specific Challenge:** The challenge is to accelerate the design, development and uptake of advanced digital technologies by European industry – especially SMEs and mid-caps –, notably in sectors where digital technologies are underexploited. SMEs and mid-caps in the manufacturing sector need support in the use of secure digital technologies in their production processes, products and business models to enable personalised products and to facilitate cost-effective small-scale production.

**Scope:** a) **Innovation Actions (IA)**

As Phase 4 of I4MS, this topic calls for Digital Innovation Hubs that strengthen European SMEs and mid-caps by experimenting and testing in one or more of the following areas. Proposers are requested to identify which of these is the centre of gravity of their proposed project. Proposals should cover the manufacturing sector at large, including discrete manufacturing, continuous production, and construction. If appropriate, building ecosystems around digital industrial platforms driven by European actors should be supported.

- **Smart modelling, simulation, and optimisation for digital twins**

  Experimentation of novel modelling, simulation, and optimisation techniques, possibly combined with high-performance computing and data analytics, for digital twins covering the full lifecycle of products and systems.
- **Laser based equipment in advanced and additive manufacturing**

Actions will focus on assessment of technologies, systems, and processes and on digitisation opportunities, including the link between design tools and production and quality assurance. Actions should include the identification of high-potential business cases and support for the development of business models.

- **Innovative Artificial Intelligence in manufacturing**

Experimentation of innovative Artificial Intelligence techniques in manufacturing, aggregating and analysing data from multiple sources, including e.g. MES (manufacturing execution systems) data, real-time process analytical data, in-line quality control, sound, video and olfactory input. Proposals are encouraged to build on the results of topic ICT-26-2018-2020.

- **Cognitive autonomous systems and human-robot interaction**

Experimentation with cyber-physical systems in production environments, with special focus on reduction of waste, energy and resource consumption and efficient logistic processes. **Adoption of robots safely cooperating with humans to support their work, improving both the efficiency and the working conditions and taking into account gender issues.** In this topic, proposals should include partners that facilitate creation and experimentation with and by the arts to ensure human acceptance of digital technologies in manufacturing and to stimulate new products and services.

- **Widening Digital Innovation Hubs**

Experimentation through Digital Innovation Hubs in regions which are so far underrepresented in Smart Anything Everywhere and I4MS, building on the work by projects “Smart Factories in new EU Member States” and “DIHELP”. The objective addresses all technology areas mentioned above and the technologies addressed in Smart Anything Everywhere and related areas. The hubs should strongly collaborate with other Innovation Actions funded under the Hubs part of the Focus Area, e.g. through joint highly innovative cross-border experiments.

Proposals should focus on minimising the entry barriers and demonstrating the clear added value of technologies, making SMEs and mid-caps more competitive by transferring innovative solutions into the wider manufacturing community. Special attention should be given to security considerations and to the development of skills.

All proposed innovation actions may involve financial support to third parties (typically in the order of EUR 20,000 to 100,000 per third party). For this topic, the four requirements described in the introductory section “Support to hubs” have to be applied.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 8 million would allow each area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. To obtain an
adequate coverage of all areas, at least one innovation action is supported for each of the areas, with the exception of the Widening Digital Innovation Hubs area, for which one innovation action is supported.

**b) Coordination and Support Action (CSA)**

The action will support the network of Digital Innovation Hubs and help achieve broad coverage in technological, application, innovation, and geographic terms, and link up with regional/national innovation initiatives, and other Digital Innovation Hubs. The action should build on the previously developed tools and innovation portal and aim to further improve them for the benefit of new Innovation Actions. The actions should also help in sharing best practices, dissemination, brokering between users and suppliers, leveraging investment and training and organise events. For these support actions, close cooperation is required with the European Factories of the Future Research Association (EFFRA), and other CSAs funded under the Digital Innovation Hubs part of the Focus Area “Digitising and transforming European industry and services”.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 1 million would allow this area to be addressed appropriately.

**Expected Impact:** Proposals should address all of the following impact criteria, providing metrics to measure success when appropriate.

- Attract a significant number of new users of advanced ICT in the manufacturing sector, and more innovative technology suppliers, in particular SMEs and mid-caps.
- A sustainable network of Digital Innovation Hubs, providing European added value to investments done at national and regional level in Digital Innovation Hubs and reaching a high leveraging effect on other sources of funding, in particular regional and national funding.

**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.*

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**DT-ICT-04-2020: Photonics Innovation Hubs**

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**Specific Challenge:** The challenge is to provide a sustainable ecosystem of research and innovation support for the benefit of SMEs facilitating a broad uptake and integration of photonics technologies. These Photonics Innovation Hubs will help speed up the uptake of photonics technologies in order to make European industry more competitive and foster new business and business models. Business cases must be industrially relevant and should include industrialisation steps to technology and market readiness levels of 7 - 8.
Scope: The focus is on the following theme

**Open access to Photonics Innovation Hubs:** One-stop-shop access, supported through a network of competence centres, to services and capabilities such as expertise, training, prototyping, design, engineering, business support, financing advice and pilot manufacturing for first users and early adopters enabling the wider up-take and deployment of photonic technologies in innovative products. Actions must build on relevant previous European initiatives and existing infrastructure at European and regional level, demonstrate a record of accomplishment in supporting industry, in particular SMEs. Actions should also address skills development as well as support to the development of new innovation hubs.

The Commission considers that either proposals covering a range of photonics technologies and requesting a contribution from the EU of up to EUR 9.5 million, or a single proposal requesting a contribution of the EU of up to EUR 19 million covering the greatest possible range of photonics technologies, would allow addressing the challenges appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. For this topic, proposals have to comply with the four requirements described in the introductory section 'Support to Hubs'. Proposals may envisage to use EU funding for financial support to third parties with a maximum amount of EUR 150,000 per third party.

**Expected Impact:** Proposals should describe how the proposed work would contribute to the listed corresponding expected impacts and metrics, the baseline and the targets to measure impact.

- Significantly improved uptake of photonics technology by end-user industry, in particular SMEs, enabling a demonstrably more competitive European industry.
- Creation of a sustainable network of Digital Innovation Hubs, providing European Added Value to investments done at national and regional level in Digital Innovation Hubs and reaching a high leveraging effect on other sources of funding, in particular Regional and National funding.

**Type of Action:** Innovation action

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

**DT-ICT-05-2020: Big Data Innovation Hubs**

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**Specific Challenge:** The challenge is to break "data silos" and stimulate sharing, re-using and trading of data assets by launching a second-generation data-driven innovation hub, federating data sources and fostering collaborative initiatives with relevant digital innovation hubs. This shall promote new business opportunities notably for SMEs as part of the Common European Data Space.
All grants under this topic will be subject to Article 30.3 of the grant agreement (Commission right to object to transfers or licensing).

**Scope:** This topic calls for Digital Innovation Hubs that strengthen European SMEs and empower European citizens by supporting them to use and combine data sources from different sectors and communities (e.g. retail, tourism, manufacturing, finance and insurance, media, healthcare, consumer support, transport, energy, public administration...) to develop innovative products and services. Special attention should be paid to fostering and facilitating the “fitness to the market” of the new solutions and data-driven business concepts, and to introducing best practices to sectors whose business models are not yet data-driven.

- **Sub-topic 1:** Federate and network the relevant actions and initiatives, especially digital innovation hubs (including national and regional hubs), that contribute to the creation of a Common European Data Space. Targeted organizations and individuals, especially SMEs, web entrepreneurs and start-ups, will be attracted to use federated data sources (including data platforms), digital infrastructures, tools and methods as accelerators for developing innovative products and services based on data sharing across sectors and borders. The federating hub is expected to run specific communication and training activities (e.g. on tools, data sources and stakeholder needs) and address, where appropriate, data standardization and interoperability issues.

- **Sub-topic 2:** Select, launch and incubate innovation experiments in view of bringing to the market new solutions and services based on secure and trusted data value chains, such as those based on actions resulting from ICT-14-2016-2017 and ICT-18-2016. Appropriate computing infrastructure, tools and support services (e.g. for GDPR compliance and data mentoring) must be made available by the Innovation Actions. Each experiment may involve support to third parties as a mini project following an open call, up to the amount of EUR 120.00093 for each such project.

- **Sub-topic 3:** Select, launch and incubate innovation experiments for data driven services and tools able to reshape the media value chain, including social media. Experiments should involve one or both of the following aspects:
  1. to explore new ways in which citizens can exploit data to better target and extend the reach of user generated content so as to increase content diversity, transparency and accountability, in a way that enables bottom-up quality journalism, science education or digital democracy.
  2. to explore new ways in which artists and more generally the creative sectors could be integrated in the development of innovative data exploitation for content creation.

For both aspects, experiments will consider the application of innovative business models and the necessary aggregation and secure handling of data available from sources such as sensors, observation data, visual data or social media supported by AI systems. Each experiment may involve support to third parties as a mini project following an open call, up to the amount of EUR 80.00095 for each such project.

One innovation action will be selected for sub-topic 1 and sub-topic 3. Innovation Actions are expected to collaborate closely with the CSAs under ICT-51-2020 and ICT-13-2018.
One innovation action will be selected for sub-topic 1 and one innovation action for sub-topic 2. Innovation Actions are expected to collaborate closely with the CSAs under ICT-51-2020 and ICT-13-2018.

The Commission considers that proposals requesting a contribution from the EU of EUR 8 to 12 million for sub-topic 1, EUR 5 to 7 million for sub-topic 2, and EUR 5 million for sub-topic 3 would allow the sub-topics to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

**Expected Impact:**
- Substantial increase in the total amount of data shared and exchanged in the federated incubators, including closed/proprietary/industrial data;
- At least 150 SMEs and web entrepreneurs, including start-ups, participate in federated incubators, with an average 30% annual increase in the sales of the incubated companies;
- Improved service quality and user satisfaction resulting from optimized data-driven processes and business models.

**Type of Action:** Innovation action

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

**DT-ICT-09-2020: Boost rural economies through cross-sector digital service platforms**

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**Specific Challenge:** Rural areas represent most of Europe's territory (91%) and population (59%). When measuring against socio-economic indicators rural areas tend to lag behind urban areas. Lower population and business density make it more challenging to develop private businesses and public services in rural areas.

Rural areas are key to solve many of the big societal challenges such as climate change or the sustainable provision of food, biomass and energy. European rural areas are places of great assets and they can become more attractive if the provision of jobs, basic services, including health and care, connectivity, smart transport, and energy solutions, as well as a favourable climate for entrepreneurship, are ensured. Among the priorities to be addressed, overcoming the digital divide between rural and urban areas and developing the potential offered by increased connectivity and digitisation of rural areas must receive particular attention.

In particular, one key challenge is to overcome the barrier of missing interoperability of smart object platforms and service platforms that share and exploit data between them. This
should trigger the emergence of a dynamic rural ecosystem, which in turn can lead to the development of cross-platform applications that ultimately contribute to increasing economic growth in rural areas and support their contribution to tackling societal challenges.

**Scope:** Proposals are expected to develop and demonstrate cost-efficient and flexible cross-domain applications through large-scale pilots. These should build on an open, API-based, interoperable and federated IoT architecture and include a reference implementation supporting flexible integration of heterogeneous services. Pilots should bridge the interoperability gap of the smart object platforms and create markets for service- and application providers as well as platform operators, supported by a vibrant ecosystem of developers, service providers and user communities.

In developing the pilots, proposals are expected to address all of the following aspects:

- The integration of data and information across different platforms for sustainable and efficient service provision, where appropriate based on Artificial Intelligence. The approach should showcase platform interoperability in line with relevant standards.
- To develop an open marketplace with an open application interface for cross-cutting services to cater for new business opportunities.
- Reference implementations including proof-of-concept, large-scale demonstrations and validation leveraging on platforms developed elsewhere.
- To create innovation ecosystems based on ‘Platforms for Connected Smart Objects and Services’, to support citizens and businesses for a multiplicity of novel applications.
- The development of pilots demonstrating benefits, cost-efficiency, flexibility and realistic business models required in rural areas around existing infrastructure, and to utilise links to other European, national or private funding sources to leverage infrastructure delivery.
- Potential application areas could include one or more of the following: public services, energy, autonomous robotics transport, logistics, education, tourism, health and care. The applications should support the implementation of the smart villages concept oriented towards relatively underdeveloped and remotely located rural areas and communities. Innovative and technical inspiration could be sought in previous work in the following domains: smart cities, smart living and ageing well, smart - and/or social farming, forest management, distributed energy, smart logistics and mobility and e-governance.

Pilots should follow an evolutionary agile, well-delineated, and lean approach. The developed platforms should be concurrently validated in at least three large-scale regional pilots in rural settings involving partners with strong relation to public authorities. The Pilots should propose scalable technical solutions capable of meeting social and economic targets relevant to boost new rural services and business.

Key performance indicators should be defined to measure progress on citizen’s benefits in rural areas, quality of life, economic growth, job creation, new business development etc. Proposals may involve financial support to third parties, particularly for SMEs. Conditions for third parties support are set out in Part K of the General Annexes. Consortia need to define the selection process of organisations, for which financial support will be granted. Maximum
20% of the EU funding can be allocated to this purpose. The financial support to third parties can only be provided in the form of grants. The respective options of Article 15.1 and Article 15.3 of the Model Grant Agreement will be applied.

The development of the pilots should follow a participatory approach using where appropriate well-functioning existing societal groups (including for example Local Actions Groups, Rural networks, public administrations responsible for Rural Development Policies) and liaise with territorial digital dynamic development. Proposal should develop strategic approaches that will help policy makers, rural actors, citizens and project promoters on the ground to deliver results, considering the comparative strengths and needs of their respective territory, to improve the implementation of EU policies in rural areas. When necessary, internet providers should be involved in the project to ensure connectivity, which is a prerequisite for rural ICT exploitation.

For this topic, the four activities described in the introductory section 'Platforms and Pilots' must be applied. Pilot projects are expected to contribute to the consolidation and coherence work that will be implemented by the CSA supporting the activities defined under the topic "DT-ICT-13-2019: Digital Platforms/Pilots Horizontal Activities".

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

**Expected Impact:** For this topic, the impact criteria described in the introductory section 'Platforms and Pilots' have to be applied in addition to as many as possible contributions to the following impact criteria:

- Validate the brokerage platforms illustrated by an increase of cross-cutting applications and services.
- Demonstrate and show-case cross-sectorial platforms interoperability.
- Demonstrate the benefits of data sharing across platforms from different sectors.
- Exploration and validation of new industry and business processes and innovative business models validated in the context of the pilots.
- Overcome the digital divide between rural and urban areas, and to develop the potential offered by connectivity and digitisation of rural areas.
- Improve quality of life in rural areas, higher standard of living and services for citizens.
- Creation of opportunities for entrepreneurs, notably SMEs, by promoting new market openings, providing access to valuable datasets and direct interactions with users, creating new businesses in rural areas.

**Type of Action:** Innovation action

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*
DT-ICT-12-2020: AI for the smart hospital of the future

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**Specific Challenge:** European health and care systems face a number of challenges linked to the ageing of the population and an increase in the prevalence of chronic conditions. With budget constraints, the health and care systems face rising cost pressures for systems and problems of sustainability. There is a consensus that health systems need to undergo adaption if they are to adequately respond to future population health needs.

New digital technologies will play a role in transforming health and care systems. In particular, artificial intelligence and robotics, have the potential to transform health and care facilities across their range of functions from the clinical aspects (screening and prevention, diagnosis, treatment, surgical support) to organisational and logistical aspects (such as the management and distribution of medicines and wider supplies across the facility). Given that health facilities such as hospitals consume the major proportion of resources available to health and care budgets, efficiency gains in these facilities may support sustainability of the system as a whole.

Innovative AI based systems (robotics, big data, machine learning, autonomous systems, conversational agents, etc.) have shown considerable promise so far, however their effective use in the delivery of health and care depends on their successful integration (and acceptation) within existing health and care facilities such as hospitals, primary care centres and care homes.

Therefore, piloting at scale is needed to prove the transformative impact of AI. Pilots need to be embedded in operational health and care settings and built around well specified open physical and digital platforms that are able to demonstrate operational and economic benefits sufficient to justify wider uptake by health and care policy makers.

AI in this context has the potential to deliver integrated physical and digital services that address a wide range of healthcare applications, for example in patient care, diagnosis, treatment and in hospital based laboratory and support services. Ethical, privacy and trust aspects should be addressed, as appropriate.

**Scope:** Devise in-facility pilot demonstrators that deliver innovative AI-based solutions in a health and care setting such as a hospital, primary care facility or care home. Pilots should enable or support clinical, diagnosis and treatment, etc. carried out with clinical outcomes comparable to human delivered procedures and with comparable results.

Proposals may address any aspect of health facility operations across their range of functions, such as diagnostics, treatments, logistical aspects, etc. Proposals must indicate how their proposed solution will perform when measured against particular health and care metrics suitable for the aspect of operations chosen. Proposal should be developed with health and care facility partners and consider wider dimensions such as how they will work within the broader aspects of impact on resources, staff training and alignment with existing
The deployed solutions should build AI-based systems that combine digital and physical services that support individualised and integrated care solutions in care facilities, such as hospitals, clinics, primary care centres, rehabilitation centres, care homes, etc.

Proposals must clearly demonstrate, in context, the integration of autonomous smart components unpinning AI that physically affect the working environment together with those that gather and process data and must clearly show how, in a health and care context, direct and positive impact on effectiveness and efficiency are expected to be achieved.

Proposals must integrate health and care partners in the design of the pilot, the development of performance indicators, as well as to allow access to the relevant operational environment.

Proposals must demonstrate likely “at scale” benefits in efficiency or cost reduction and demonstrate the effectiveness of any novel service models in providing economic justification for scale-up investment. Proposals should also identify opportunities for the development of European standards that enable wide spread adoption and new market creation.

Privacy and cybersecurity issues, including security by design and data integrity should also be addressed, where appropriate.

Proposals must seek to align with the European Digital Innovation Hub networks and platforms funded under DT-ICT-02-2018: Robotics - Digital Innovation Hubs (DIH). When assessing proposals, the Commission will take into account the value of having a spread of projects addressing different health and care functions (for instance, surgery, rehabilitation, logistics in hospital, etc.).

The Commission considers that proposals requesting a contribution from the EU between EUR 7 and 10 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

- Emergence of European-led AI based pilots for the smart hospital of the future, enabled by open system platforms
- Demonstration of effectiveness, in use, of AI based technologies, such as smart robots, in a range of healthcare tasks
- Engagement of healthcare policy makers, investors, stakeholders and through the pilot.
- Effective basis for developing deployable applications
- Reaching a high leveraging effect on other sources of funding, in particular regional and national funding
- Contributing to trust and acceptance building in the AI technology among all stakeholders (including patients, their formal and informal caregivers, decision makers, etc.).

Type of Action: Innovation action
The conditions related to this topic are provided at the end of this call and in the General Annexes.

Call – Cybersecurity

SU-ICT-02-2020: Building blocks for resilience in evolving ICT systems

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Specific Challenge: Algorithms, software and hardware systems must be designed having security, privacy, data protection, fault tolerance and accountability in mind from their design phase in a measurable manner, taking into account future-proof, advanced cryptographic means. Relevant challenges include: (a) to develop mechanisms that measure the performance of ICT systems with regards to cybersecurity and privacy and (b) to enhance control and trust of the consumer of digital products and services with innovative tools aiming to ensure the accountability of the security and privacy levels in the algorithms, in the software, and ultimately in the ICT systems, products and services across the supply chain.

Scope: Proposals are invited against at least one of the following three subtopics:

a) Cybersecurity/privacy audit, certification and standardisation

Innovative approaches to (i) design and develop automated security validation and testing, exploiting the knowledge of architecture, code, and development environments (e.g. white box) (ii) design and develop automated security verification at code level, focusing on scalable taint analysis, information-flow analysis, control-flow integrity, security policy, and considering the relation to secure development lifecycles, (iii) develop mechanisms, key performance indicators and measures that ease the process of certification at the level of services and (iv) develop mechanisms to better audit and analyse open source and/or open license software, and ICT systems with respect to cybersecurity and digital privacy. These approaches may be accompanied by creating information bases to measure and assess the security of digital assets. Proposals should make use of existing standards to the extent possible, and should strive to contribute to relevant standardisation efforts.

b) Trusted supply chains of ICT systems

Innovative approaches to (i) develop advanced, evidence based, dynamic methods and tools for better forecasting, detecting and preventing propagated vulnerabilities, (ii) estimate both dynamically and accurately supply chain cyber security and privacy risks, (iii) design and develop security, privacy and accountability measures and mitigation strategies for all entities involved in the supply chain, (iv) design and develop techniques, methods and tools to better audit complex algorithms (e.g. search engines), interconnected ICT components/systems (v) devise methods to develop resilient systems out of potentially
insecure components and (vi) devise security assurance methodologies and metrics to define security claims for composed systems and certification methods, allowing harmonisation and mutual recognition based primarily on evidence and not only on trust. The trusted supply chain for ICT systems/components should be considered by proposals in its entirety, in particular by addressing the IoT ecosystems/devices that are part of the supply chain.

c) Designing and developing privacy-friendly and secure software and hardware

Innovative approaches to establish methods and tools for (i) security and privacy requirements engineering (including dynamic threat modelling, dynamic attack trees, attack ontologies, dynamic taxonomies and dynamic, evidence based risk analysis), (ii) embedded algorithmic accountability (in order to monitor the security, privacy and transparency of the algorithms/software/systems/services), (iii) system-wide consistency including connection between models, security/privacy/accountability objectives, policies, and functional implementations, (iv) metrics to assess a secure, reliable and privacy-friendly development, (v) secure, privacy-friendly and accountability-enabled programming languages (including machine languages), hardware design languages, development frameworks, as well as secure compilation and execution, (vi) novel, secure and privacy-friendly IoT architectures enabling consistent trustworthy and accountable authentication, authorization and accounting services across IoT devices/ecosystems with enhancement of Public Key Infrastructures (PKIs) aiming to support PKI services (e.g. registration, revocation) for IoT devices.

For each of the sub-topics above, the outcome of the proposals is expected to lead to development up to Technology Readiness level (TRL) 5.

The Commission considers that proposals requesting a contribution from the EU of between EUR 4 and 5 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. For grants awarded under this topic for Research and Innovation Action the Commission or Agency may object to a transfer of ownership or the exclusive licensing of results to a third party established in a third country not associated to Horizon 2020. The respective option of Article 30.3 of the Model Grant Agreement will be applied.

Expected Impact: Short/medium term

- Improved market opportunities for the EU vendors of security components.
- Increased trust both by developers using/integrating the ICT components and by the end-users of IT systems and services.
- Protect the privacy of citizens and trustworthiness of ICT.
- Acceleration of the development and implementation of certification processes. Long term
- Advanced cybersecurity products and services will be developed improving trust in the Digital Single Market.
- The use of more harmonized certification schemes will increase the business cases for cybersecurity services as they will become more reliable.
• Validation platforms will provide assessments with less effort compared with nowadays and assure a better compliance with relevant regulations and standards.

**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.*
Nanotechnologies, Advanced Materials, Biotechnology and Advanced Manufacturing and Processing

Call – Foundations for Tomorrow’s Industry

DT-NMBP-04-2020: Open Innovation Test Beds for nano-enabled bio-based materials (IA)

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Specific Challenge: Nano-enabled bio-based materials can contribute to a stronger circular economy and more sustainable growth, with due consideration to life-cycle impact as well as their potential to substitute scarce materials. Novel approaches should be deployed for industry to produce new, eco-friendly, nano-enabled bio-based materials with advanced properties and functionalities relevant for various applications.

The challenge is to upscale and demonstrate in an industrial environment the sustainable conversion of different types of feedstock and bio resources in value-added novel, advanced, nano-enhanced bio-based materials and their application in products.

Scope:

- Establish Open Innovation Test Beds (OITB) by upgrading existing or developing new materials facilities and pilot lines, and make available to industry and interested parties, including SMEs, their services for the design, development, testing, regulatory (including safety) and environmental assessment, and upscaling of specific material compositions;
- The focus is on new nano-enabled bio-based materials’ functions, features, capabilities, robustness and properties, processing techniques and optimisation of process parameters, from the transformation of bio-based building blocks and to the production of new, eco-friendly, nano-enabled bio-based materials relevant to various applications, covering the full scale of new or existing industrial and consumer products;
- Proposals should assess regulatory, safety, economic and technical barriers and should develop and validate tools to enable in-line quality control processes;
- **Open access at fair conditions and cost as well as outreach and dissemination across Europe, based on a distinct methodology;**
- Materials should be demonstrated in relevant industrial environments;

Proposals submitted under this topic are encouraged to include actions designed to facilitate cooperation, across Europe, with other projects; to enhance user involvement; and to ensure the accessibility and reusability of data produced in the course of the project.
Proposals should therefore include a business case and exploitation strategy, as outlined in the LEIT Introduction in this Work Programme. In particular, they should demonstrate the likelihood of an additional turnover of at least 4 times the requested EU funding, within 5 years of the end of the grant.

Activities should start at TRL 4 and achieve TRL 7 at the end of the project.

The Commission considers that proposals requesting a contribution from the EU between EUR 7 and 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 Open Innovation Test Bed should help industrialise a new generation of nano-enabled bio-based materials. Proposals must address all the following impact criteria:

- Realisation of open and upgraded facilities at the EU level for the design, development, testing, safety assessment, and upscaling of nano-enabled bio-based materials, easily accessible to users across different regions of Europe;
- At least a 20% increase in the number of new SME users for existing test beds;
- At least 15% improved industrial process parameters and 20% faster verification of materials performance for highly promising applications;
- At least 20% improvement in industrial productivity, reliability, environmental performance, durability, and reduction of life-cycle costs of these materials;
- Facilitating access to finance (for SMEs in particular) for investing in these materials or in applications using them;
- Identification of regulatory requirements and regulatory barriers to market introduction. Relevant indicators and metrics, with baseline values, should be clearly stated in the proposal.

Type of Action: Innovation action

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

**DT-NMBP-05-2020: Open Innovation Test Beds for materials for building envelopes (IA)**

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Specific Challenge: "Nearly zero-energy, zero emission buildings" can make substantial contributions to COP21 goals. However, a large scale deployment of these buildings relies on marketable, cheap, flexible, on demand material based-solutions for energy and resource efficient buildings. The challenge is to show that laboratory based solutions are replicable and can be up-scaled to solutions attractive and profitable for real applications. It is, therefore, crucial to act on real building envelopes, through actions that would create
profound economic, social and environmental impacts, bringing together industry, public authorities and citizens. An Open Innovation Test Bed with services across multiple member states will enable these actions while also helping developers of innovative building solutions adhere to EU regulatory practices, including their adaption to local specifications.

Scope: Open Innovation Testbeds for building envelopes including roofs and facades should use buildings as “living laboratories” by:

- Open Innovation Test Beds (OITB) should upgrade or develop materials facilities and make available to industry and interested parties, including SMEs, services for the design, development, testing, safety assessment, and upscaling of smart envelope elements particularly for energy saving and emission reduction of buildings;
- Integrating solutions in a “nearly zero-energy, zero emission” design concept together with solutions for indoor and outdoor air quality control, taking into account EU Energy and Environment policies;
- Providing robust monitoring approaches, as well as methodologies and tools to: monitor in a quantifiable way (at least 24 months), the efficacy, performance and cost-effectiveness of the solution compared to existing alternative options; assess how the solutions contribute to the different EU environmental and energy challenges, taking into account different environmental exposure scenarios and durations, including impact of inhabitants.
- Enabling the replication of prototypes in different buildings, regulatory contexts, including business model replication and protocols for design, taking into consideration the trade-offs between the three sustainability pillars, the life cycle stages as well as their impacts;
- Regulatory, economical and technical barriers should be identified and assessed. Where applicable, risk-assessment procedures e.g. fire, safety and noise should be considered;
- Facilitating the communication of local authorities, regulatory and standardisation bodies with innovators of building materials to rapidly address regulatory issues;
- Open access at fair conditions and cost as well as outreach and dissemination across Europe, based on a distinct methodology;
- Use of computer aided design, modelling and simulation of processes and products.

Proposals submitted under this topic are encouraged to include actions designed to facilitate cooperation, across Europe, with other projects; to enhance user involvement; and to ensure the accessibility and reusability of data produced in the course of the project. Proposals should therefore include a business case and exploitation strategy, as outlined in the LEIT Introduction in this Work Programme. In particular, they should demonstrate the likelihood of an additional turnover of at least 4 times the requested EU funding, within 5 years of the end of the grant.

Activities should start at TRL 4 and achieve TRL 7 at the end of the project.

The Commission considers that proposals requesting a contribution from the EU between EUR 7 and 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:

- Realisation of open and upgraded facilities at the EU level for the design, development, testing, safety assessment, and upscaling of materials and components for building envelopes, easily accessible to users across different regions of Europe;
- Facilitated access to building testing/monitoring equipment and to finance (in particular for SMEs) through a single entry point;
- At least a 20% increase in the number of new SME users for existing test beds;
- At least 20% improved industrial process parameters and 30% faster verification of materials performance for highly promising applications and at least 30% reduction in energy consumption across the entire life cycle;

Relevant indicators and metrics, with baseline values, should be clearly stated in the proposal.

Type of Action: Innovation action

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

DT-NMBP-06-2020: Open Innovation Test Beds for nano-pharmaceuticals production (IA)

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Specific Challenge: Laboratories across Europe and the world develop novel promising laboratory proof-of-concepts for nano-pharmaceuticals. These proofs-of-concept show strong potential for providing more effective and safer therapies and diagnostic procedures (e.g. medical imaging) for a wide range of diseases. For example, nano-pharmaceuticals may improve bio-availability, reduce toxicity and side effects and allow more targeted and controlled delivery of drugs to affected organs, tissues and cells. At the same time they may also include components that act as contrast agent for medical imaging. A major challenge is to produce the novel nano-pharmaceuticals to GMP (Good Manufacturing Practice) quality, maximising bioavailability and stability and in sufficient quantity for late pre-clinical and clinical testing. To this end the production of the nano-pharmaceuticals needs to be scaled-up from a small laboratory scale in the milligram range to a larger scale. A high level of GMP quality needs to be ensured, for example in terms of particle size and sterility (where appropriate), as required by the regulations for medicines.

Scope:

- Open Innovation Test Beds (OITB) should upgrade or develop nano-pharmaceutical materials production facilities and make available to industry and interested parties, including SMEs, services for the design and development of production processes, characterisation and quality control of nano-pharmaceuticals;
• The OITB should provide GMP certified batches of nano-pharmaceuticals suitable for late pre-clinical and clinical testing and in accordance with European regulatory requirements for medicines;
• The OITB need to provide guidance for late pre-clinical and clinical testing, which itself could be done outside the OITB, benefitting from already existing infrastructures, and/or within the same OITB;
• **Open access at fair conditions and cost as well as outreach and dissemination across Europe, based on a distinct methodology;**
• The users / clients of the OITB will typically be SME’s and laboratories with innovative proofs-of-concept and IPR for developing novel nano-pharmaceuticals and demonstration of the scalability of the production process of the technology.

Proposals submitted under this topic are encouraged to include actions designed to facilitate cooperation, across Europe, with other projects; to enhance user involvement; and to ensure the accessibility and reusability of data produced in the course of the project.

Proposals should therefore include a business case and exploitation strategy, as outlined in the LEIT Introduction in this Work Programme. In particular, they should demonstrate the likelihood of an additional turnover of at least 4 times the requested EU funding, within 5 years of the end of the grant.

Activities should start at TRL 4 and achieve TRL 7 at the end of the project.

The Commission considers that proposals requesting a contribution from the EU between EUR 7 and 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 OITB should improve the European infrastructure and competence in nano-pharmaceutical process development, characterisation, quality control and pilot production, while taking into account the medical regulatory requirements. Proposals must address all the following impact criteria:

• Realise open and upgraded facilities at the EU level for the development, characterisation, quality control and production of nano-pharmaceuticals, easily accessible to users across different regions of Europe;
• Improved availability and flexibility of nano-pharmaceuticals supply with GMP quality for late pre-clinical and clinical trials, meeting medical regulatory requirements;
• Increase of the attractiveness of Europe as a location-of-choice to carry out advanced medical and nano-pharmaceutical research and product development, due to improved nano-pharmaceuticals supply capacity and availability of a rich eco-system of related suppliers of products and services;
• Contribution to demonstrating the effectiveness of nano-pharmaceuticals for medical therapies and / or diagnostic procedures (e.g. medical imaging);
• **Improvement of user’s knowledge on medical and pharmaceutical regulatory aspects, especially of academics and SMEs;**

Relevant indicators and metrics, with baseline values, should be clearly stated in the proposal.

**Type of Action:** Innovation action
The conditions related to this topic are provided at the end of this call and in the General Annexes.

DT-NMBP-11-2020: Open Innovation Platform for Materials Modelling (RIA)

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**Specific Challenge:** In order to make business decisions, industry requires material model workflows spanning from materials design to materials processing and manufacturing validated in an industrial context, which meet specified technical as well as business requirements (with quantified key performance indicators). An open access materials modelling platform can build and execute such complex workflows chosen by industry based on information provided by e.g. the Open Translator Environment, Business Decision Support Systems and Materials Modelling Market Place. Easily accessible and standardised workflows that are swiftly implemented at the platform would assist in the evaluation of materials and materials processing possibilities.

**Scope:** The aim is to establish an open innovation platform for integrated materials modelling and materials processing development for industry that would facilitate setting up experiments, reduce error and enhance efficiency of the development process.

A modelling framework applicable to a certain type of materials and their related processing technologies should be developed. This modelling framework should develop a seamless and standardised integration of third party physics-based models, solvers, post-processors and databases based on existing and emerging standards for semantic interoperability across domains, **resulting in an open framework**.

The proposals should also:

- Develop apps that can be integrated readily in Business Decision Support Systems and in the Open Translator Environment to assist rapid and efficient decision making;
- Develop validation methodologies and benchmarks. In depth success stories including gap-analysis of existing models should drive future concerted research activities and efforts aimed at enhancing existing models;
- Provide contributions to the development of a standardised ontology covering modelling, characterisation, materials processing and materials manufacturing;
- Establish a business model for maintenance of the platform based on proposed access schemes at fair conditions and cost across Europe demonstrating the sustainability of the platform beyond the funding period.

The activity should link with the Materials Modelling Market Place to provide the access to all necessary models, tools, expertise and data that are necessary to populate the workflows with and to the HPC platforms to complete the offers to customers. Therefore, proposals
should foresee a dedicated work package for cooperation and earmark appropriate resources.

Proposals submitted under this topic should include a business case and exploitation strategy, as outlined in the Introduction to the LEIT part of this Work Programme. Activities should start at TRL 3 for the workflows and achieve TRL 6 for the platform at the end of the project.

The Commission considers that proposals requesting a contribution from the EU between EUR 4 and 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: Proposals must address all the following impact criteria, providing metrics to measure success when appropriate.

- Deliver predictable and traceable simulation workflows and better integration of materials modelling in the industrial manufacturing process and thus contribute to a coherent digital single market in the field of materials modelling;
- Provide rapid deployment of novel materials modelling solutions in particular in manufacturing-targeted domains with improved decision making on the level of materials, processing and sustainable market differentiating products;
- Increase speed of material/product development time;
- Quality by design reducing the costs and time to market of novel materials and processes and speeding up the rate of industrial transformation to high-added-value products;
- Support the Open Innovation Testbeds leading to an integrated materials development environment in Europe;
- Allow reuse of material modelling knowledge and expertise in different industrial sectors and enable cross – industry fertilisation.

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.

NMBP-38-2020: Citizens and industrial technologies (CSA)

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Specific Challenge: Key enabling technologies, in addition to their importance to industry, provide new solutions to global challenges and are changing both societies and working conditions. Dialogue with citizens is therefore essential, in order to focus on the correct priorities and in identifying issues during development, as well as for building trust. The challenge is two-fold: (i) enhance public understanding of cutting-edge technologies and their diverse applications; and (ii) engage citizens in dialogue and co-creation on priorities,
expectations and concerns.

Scope: Previous work on societal engagement has focused on specific technologies, notably nanotechnology, and their potential benefits and risks. The human dimension has also been considered, notably in manufacturing technologies. The proposal should build on this work, to engage with wider society in the broader context of key enabling technologies, in order to develop those technologies in ways that intrinsically reflect societal values and needs.

The proposal should launch a participatory multi-actor engagement process, including workshops, deliberations and working groups, using primarily existing practical models of engagement. The proposal should consider selected applications addressing global challenges, e.g. health, climate and the circular economy, as well as the changing nature of work.

This multi-actor engagement process should include appropriate disciplines of Social Sciences and Humanities (SSH), researchers, industry, manufacturers, professional users and citizens, paying attention to the roles of citizens as workers and consumers. The proposed action should take into account the diversity of cultural contexts of processes and communication within Europe, and start with an evaluation of previous related projects and societal debates on emerging technologies. It should use dynamic public engagement concepts designed specifically for co-creation. The activities should take into account gender, social and cultural aspects, as well as existing knowledge on Responsible Research and Innovation (RRI).

The Commission considers that proposals requesting a contribution from the EU around EUR 1.5 million (depending on the additional activities pursued) would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

- **A toolbox, freely available to all stakeholders, for citizen engagement in key enabling technologies.** This should cover practical steps to enable industry to work with citizens in order to recognise and respond to societal trends, and develop corporate social responsibility. This would subsequently be of use to technology projects and industrial partnerships.

- **Recommendations and tested activities for citizen engagement in technologies**, usable by industry, procurers (such as cities) and other stakeholders;

- An enhanced understanding of the role of key enabling technologies in society and in the workplace; and

- **two-way citizen engagement** in the strategies behind the support for, and applications of, key enabling technologies;

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.*
DT-NMBP-39-2020: Towards Standardised Documentation of Data through taxonomies and ontologies (CSA)

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**Specific Challenge:** Standardised data documentation with metadata based on an agreed ontology across the domains covered by this work _programme is critical for the widest use of data and, ultimately, reliable end-user products._

The challenge is for all relevant stakeholders to develop, test, validate and agree on data documentation to ensure consistency and interoperability of intra-and cross-domain specific taxonomies and ontologies. The standardised data documentation should be developed with a global ambition through international cooperation.

**Scope:** The proposals should develop EU-wide standardised data documentation that ensures interoperability of data. The data documentation should take the form of an actionable ontology that consists of a top level ontology, adapted existing domain ontologies (such as manufacturing, materials processing, materials modelling, nano-safety, characterisation and life cycle sustainable analysis ontologies), complemented by new ontologies for other subdomains.

In particular, the projects should:

- Network relevant stakeholders to collect input on existing data documentation;
- Develop and agree on a top level ontology to connect relevant subdomains of this work programme;
- Harmonise existing ontologies with respect to the top level ontology;
- Develop and agree on new ontologies for relevant sub-domains of this work programme;
- Deliver at least ten demonstrators on the use of ontologies (decision systems, innovation projects, workflows, quality assurance, guided AI and data parsing...). Projects should liaise with the work done under the European Open Science Cloud, standardisation bodies, the Research Data Alliance and other relevant initiatives. Existing taxonomies and/or ontologies relevant for this part of the programme should be taken into account. Therefore, proposals should foresee a dedicated work package for this cooperation and earmark appropriate resources. Proposals should guarantee the maintenance and further development of the ontology and data documentation after the project duration. The vast majority of the deliverables, including subsequent taxonomies and ontologies, should be public.

The Commission considers that proposals requesting a contribution from the EU around EUR 4 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:** Proposals must address all the following impact criteria, providing metrics to measure success where appropriate.
enable a standardised and operational data documentation at intra- and cross-across domains covered by this work programme that meets the FAIR data principles;

- Enable a mechanism to allow practical and user-friendly re-usability of data across domains and industrial sectors;
- Enable a maintained and continuously developed ontology and data documentation to ensure long-term relevance and implementation;
- Facilitate uptake of new project results;
- Improved ability to build interoperable software solutions in materials, process and manufacturing;
- A better integrated materials, processes, and manufacturing development environment in Europe from networking academics, innovation hubs and industry.

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.

DT-NMBP-40-2020: Creating an open market place for industrial data (RIA)

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Specific Challenge: In line with the objectives of Open Science and Open Innovation, the challenge is to make data FAIR through an effective common information system that allows in particular business-to-business data sharing and enables new or improved products, processes and services. Such a system should take the form of a user-friendly, state-of-the-art marketplace that is open to all providers and users of data to maximise the spill over of knowledge across all economic sectors. The marketplace should be based on standardised documentation of data, agreed ontologies as gradually provided by NMBP-39-2020 (Towards Standardised Documentation of Data through taxonomies and ontologies) and be flexible to adapt to the emerging developments of Industry Commons.

Scope: Proposals must address all the areas below:

- Build an effective information system based on a widely agreed standardised data documentation ensuring semantic interoperability using metadata and a widely agreed ontology for the domains covered by this work programme;
- Encourage sharing of data and population of the information system with an ontology-based documentation of distributed open and confidential databases;
- Facilitate and demonstrate collaboration by creating a collaborative space using existing generic data platforms (e.g. created in Call ICT-13-2018-2019, DT-NMBP-20-2018) that can operate based on the agreed ontology;
- Facilitate extracting, analysing and re-using of the data with modern data processing technologies e.g. Artificial Intelligence;
• Provide innovative trainings and manuals for the use of the market place and its data documentation;
• Deliver at least five business-to-business success stories based on data sharing and launch three hackathons targeted at innovators and young people;
• Develop a business model for the maintenance of the market place demonstrating its sustainability beyond the funding period.

In order to ensure adoption of the standardised data documentation by third parties, proposals should foresee a dedicated work package for cooperation with projects under topic NMBP-39-2020 amongst others, and earmark appropriate resources.

Proposals submitted under this topic should include a business case and exploitation strategy, as outlined in the Introduction to the LEIT part of this Work Programme.

Activities should start at TRL 3 and achieve TRL 6 at the end of the project.

The Commission considers that proposals requesting a contribution from the EU around EUR 4 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:** Proposals must address all the following impact criteria, providing metrics to measure success where appropriate:

- An operational and accessible, user-friendly open market place for data, knowledge, tools and services to enable new or improved products, processes and services for any sector of the economy;
- Increased collaboration and trust between data suppliers and data users gaining also a competitive advantage for them;
- Increased diffusion and creation of new market opportunities and new solutions by facilitating data based innovation across the economy;
- Improved effectiveness and responsiveness of decision-making, in particular based on materials, product and process information;
- Improved quality by design reducing the costs and time to market and speeding up the rate of industrial transformation to high-added-value products.

**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.*
Call – Transforming European Industry

DT-FOF-10-2020: Pilot lines for large-part high-precision manufacturing (IA 50%)

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**Specific Challenge:** The production of large-scale parts has achieved so far a relatively low level of mechanisation and automation because standard machines and design procedures are not suitable for these parts and specific equipment is too slow and too expensive. Moreover, repairing large parts requires operating in difficult spaces. All this causes problems of quality and repeatability. Therefore, industry needs more automated production and in-situ repair methods for new innovative and multi-functional products.

Recent research in the large-scale parts production has delivered high quality demonstrators, although generally quite specific and with a too limited impact. Full-scale, reconfigurable, modular and flexible pilot lines including different processing facilities, thermal treatment, control and characterisation could demonstrate comprehensive highly visible prototypes.

**Scope:** The proposals should deliver reliable high-precision processes to manufacture and repair innovative large-scale parts, such as wind turbine blades, large vehicles (aerospace, road or rail), ships or ship segments, construction components, large industrial components, etc. Proposals should cover at least three of the following areas and demonstrate them in a relevant industrial environment:

- Upgrading manufacturing equipment using several innovative steps for high precision manufacturing, in order to obtain an integrated and modular process;
- Implement design, modelling and simulation tools to support the selection of processing parameters;
- Introduce new methods and instruments for process characterisation and in-line process control of the large-scale parts, to guarantee the quality of the final outcomes including high precision (e.g. non-destructive testing);
- Develop work-holding devices to reduce the repositioning of all components, as well as new methods for equipment calibration and in-process fast recalibration.

Proposals should cover demonstration activities in industrial settings building on the outcomes of the Factories of the Future programme. **Open Access to the pilot lines for training people is strongly encouraged.**

Proposals submitted under this topic should include a business case and exploitation strategy, as outlined in the Introduction to the LEIT part of this Work Programme. Activities should start at TRL 5 and achieve TRL 7 at the end of the project.

The Commission considers that proposals requesting a contribution from the EU between EUR 12 and 15 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.
As an exception from General Annex D, the funding rate for eligible costs in grants awarded under this topic will be differentiated: 100% of the eligible costs for beneficiaries and linked third parties that are non-profit legal entities; and 50% of the eligible costs for beneficiaries and linked third parties that are for profit legal entities.

**Expected Impact:** The developed manufacturing process should deliver all of the following:

- Reduction of production cost by at least 15% through process integration, flexibility of the production cells, improved quality and reduction of assembly costs;
- Reduction of production time by at least 20% by a significant automation increase;
- A higher or similar precision level;
- Reduction of the scrap generated by the process by at least 20%;
- Reduction of the environmental impact and the safety hazards.

Relevant indicators and metrics, with baseline values, should be clearly stated in the proposal.

**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-BIOTEC-09-2020: Upcycling Bio Plastics of food and drinks packaging (RIA)

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**Specific Challenge:** The European Strategy for Plastics in a Circular Economy acknowledges the usefulness of plastics for the economy and our daily lives, but points out that plastics' use fails to capture the economic and environmental benefits of a more 'circular' approach. The progressive substitution of consumer products derived from fossil fuels, at all steps along the industrial value-chain, is crucial to successfully decarbonise our society. Most plastic (>98%) is produced from non-renewable sources. This is more than 400 million tonnes globally, which could become 900 million tonnes by 2050, i.e. 20% of oil consumption. The majority of plastic cannot be recycled and contains toxic additives. Some plastics are bio-based; however not all are recyclable, reusable or biodegradable.

Annually, Europe produces 78 million tonnes of plastics, 40% of is used for packaging and mainly for packaging food, drinks and other consumer products with a short shelf-live. Packaging that cannot be recycled ends up in landfills or is burnt in, a process that releases large amounts of CO2 and toxic chemicals into the atmosphere.

The challenge is to develop technologies to deal with the upcycling of plastics for food and drinks packaging. Upcycling in this context means transforming them into new materials or products of better quality or for better environmental value, ensuring that micro-plastics are avoided. This will allow the sustainable recycling or biological degradation in accordance with existing and novel technologies, standards and certification schemes.
**Scope:** Proposals will address as many as possible of the following aspects:

- Expand the potential of current technologies and materials for the manufacturing and design of bio-plastics that are recyclable and/or bio-degradable;
- Exploit known or develop new biotechnologies, based on enzymes or enzyme combinations and microorganisms, for improved recycling or biodegradation of plastics;
- Develop novel standards and certification schemes applicable to packaging materials made from recyclable and biodegradable bio-plastics;
  - Include Social Sciences and Humanities (SSH) elements and gender aspects to improve consumer attitude and behaviour with respect to purchasing and recycling food and drink packaging;
  - Take a systemic approach and involve cooperation among actors in the supply chain, from producer to final consumer, and from research to policy makers.

Projects should perform an analysis of the state of the art to avoid duplications and overlaps with past or ongoing research, including projects funded by the Bio-based Industries Initiative and the Circular Economy calls under H2020.

Clustering activities to capitalise on synergies with relevant projects selected under this topic and topic CE NMBP 26-2018 is encouraged.

Proposals submitted under this topic should include a business case and exploitation strategy, as outlined in the Introduction to the LEIT part of this Work Programme. Activities should start at TRL 3 and achieve TRL 6 at the end of the project.

The Commission considers that proposals requesting a contribution from the EU between EUR 6 and 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:**

- 60% food and drink packaging is upcycled by 2030;
- A viable roadmap to prove that by 2030 60% of the plastics still to be used for packaging of foods and drinks with short-shelf life will be produced from renewable sources;
- Contribute to the increase in new and upgraded waste recycling facilities designed to facilitate recycling via biotechnological or biochemical methods;
- Increased awareness among European citizens of products and materials upcycling capacity;
- Novel standards and certification schemes to be applied together with market pull measures such as public procurement and tax exemptions;

Indicators and metrics, with baseline values, including demonstration activities should be clearly stated in the proposal.

This topic is in support of the European Strategy for Plastics in a Circular Economy. Projects selected under this topic as well as projects selected under other topics in H2020 supporting
the Plastics Strategy are strongly encouraged to participate in joint activities as appropriate. These joint activities could take the form of clustering of projects, participation in workshops, common exploitation and dissemination etc. The proposals are expected to demonstrate support to common coordination and dissemination activities without the prerequisite to define concrete common actions at this stage.

**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.*

**NMBP-21-2020: Biological scaffolds for tissue regeneration and repair (RIA)**

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<th>SwafS Key Word(s)</th>
<th>Ethics, Gender Equality, Open Access/Open Data, Responsible Research and Innovation (RRI)</th>
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<td>Deadline</td>
<td>12 December 2019, 2nd stage Deadline 14 May 2020 17:00:00 Brussels time</td>
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**Specific Challenge:** The increasing availability of novel biomaterials with tissue regeneration properties offers the solution for many diseases, including those of a degenerative nature, particularly as integral parts of advanced therapy medicinal products or medical devices. These disorders are often poorly amenable to current healthcare interventions. The design of new biomaterials capable of inducing tissue specific regeneration, which can derive from many different pathological processes or tissue defects, as elements of these medical technologies, results from their increasing fusion/combination. The production of these technologies is highly warranted. EU intervention in this field is required to achieve this goal and thereby develop new and innovative affordable technologies delivering personalised services.

**Scope:** Research activities on functional biomaterials for regenerative medicine should show their advanced properties and their eventual field of application. These may include association with pluripotent stem cells, biostimulators, microfluidic devices, cellularised and/or biomimetic scaffolds, biological agents and appropriate disease models etc.

Proposals should cover one of the following domains:

- Targeted musculoskeletal delivery of cells or biologically active agents and innovative biomaterials for articular cartilage/disc, ligament and tendon repair in weight-bearing joints;
- Stimulation of healing in chronic and infected wounds and ulcerative processes (with or without biofilms as necessary);
- Preventing microbial infection and concurrently promoting tissue regeneration in dental implants and/or dental root surgery;
- Implementation of innovative manufacturing technologies (e.g. 3D printing) for affordable fabrication of patient-specific scaffolds planned in respect of the foregoing.
Proposals should address relevant local, national and international ethical and regulatory requirements, take into account gender aspects and include a section on research data management.

Proposals should liaise with a broad and multidisciplinary community of stakeholders (e.g. in the form of a user committee) and should include the appropriate disciplines of Social Sciences and Humanities (SSH) working in the health domain. Therefore, proposals should foresee a dedicated work package for cooperation and earmark appropriate resources.

Proposals submitted under this topic should include a business case and exploitation strategy, as outlined in the Introduction to the LEIT part of this Work Programme.

Activities should start at TRL 3 and achieve TRL 5 at the end of the project.

The Commission considers that proposals requesting a contribution from the EU of between EUR 4 and 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:

- Development of technologies to discover, produce and improve performance of custom-made innovative biomaterial structures for the repair or regeneration of human scaffolds and organs as outlined above, e.g. additive manufacturing, rapid prototyping, electrospinning, etc. of prototypes on demand;
- Enhanced competitiveness of the biomaterials and biomedical industries of the EU, in particular, through interdisciplinary technology transfer effects between biotechnology companies;
- Reduction of healthcare costs related to rehabilitation time or medical device associated infections.

Relevant indicators and metrics with baseline values must be clearly stated in the proposal.

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.*

**DT-NMBP-23-2020: Next generation organ-on-chip (RIA-LS)**

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**Specific Challenge:** ‘Organ-on-Chip’ (OoC) is a promising technology for achieving more effective in-vitro research in a broad range of life science sectors, including medicine and pharmacy, cosmetics, agriculture and food, and for chemical safety testing including regulatory testing. More effective drug development, efficacy and safety screening, would reduce the need for animal testing and clinical testing. Nevertheless, much more research
and development is needed to develop more robust, automated and parallelised OoC technologies that are applicable in industry, with medium to high throughput capacity, reliability and repeatability, using validated and standardised tools and methods.

Scope:

- Multidisciplinary research for the development of Organ-on-Chip technologies able to mimic human organs and organ-systems, based on integrated platforms involving technologies such as: cell culturing (including multi-tissue or multi-organ arrangements), micro-fluidics, micro/nano-sensors, imaging, actuators, 3D bioprinting, modelling and simulation, bioinformatics;
- Demonstrator applications involving modelling, diagnosis and therapy of human disease(s) of high and yet unmet medical need. The new devices should permit the simulation of body system processes under adverse conditions and in particular in disease states, healing and regeneration under mechanical stress and electrical stimulation, or immune responses, taking into account sex and gender differences, when relevant;
- Industrial development/piloting towards improved robustness, reliability, scalability, parallelisation and standardisation of tools and methods, and providing interfaces to standard laboratory equipment;
- Taking into account medical regulatory requirements.

A related topic (SC1-BHC-11-2020: Advancing the safety assessment of chemicals without the use of animal testing) is published under the part "Health, demographic change and wellbeing" of the work Programme.

Proposals submitted under this topic should include a business case and exploitation strategy, as outlined in the Introduction to the LEIT part of this Work Programme.

Activities should start at TRL 3 and achieve TRL 5 at the end of the project.

Please note that this topic will take the form of lump sums as defined in Commission Decision C(2017)7151 of 27 October 2017. Details of the lump sum funding pilot scheme are published on the Funding & Tenders Portal together with the specific Model Grant Agreement for Lump Sums applicable.

The Commission considers that proposals requesting a contribution from the EU of between EUR 4 and 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:

- Verifiable progress in the application of Organ-on-Chip technologies for in-vitro research;
- Reduction of the need for animal and clinical testing;
- Lowering of barriers for application of Organ-on-Chip technology;
• Improved competitiveness and attractiveness of the European biomedical and healthcare sector;
• Increased awareness and knowledge about medical regulatory policies and requirements, especially by academics and SMEs.

Type of Action: Research and Innovation action Lump Sum

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

Call – Industrial Sustainability

**DT-SPIRE-11-2020: Artificial Intelligence and Big Data Technologies for Process Industries (CSA)**

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**Specific Challenge:** Process Industries are becoming increasingly digitised. The development of devices, sensors and actuators, connected through the internet of things, allows machines to acquire capabilities such as identifying and optimising solutions, or making complex decisions. Enormous amounts of data are being generated but are typically exploited locally, for a unique purpose. Artificial intelligence (AI) is acknowledged as a key enabling technology but its actual potential is much more vast than the current state of the art in industrial applications suggest.

**Scope:** The Coordination and Support Action should identify, based on a mapping of digital technologies in process industries and their level of penetration, which specific AI- and big data technologies are most relevant, and what are, or could be, the most relevant application cases and/or pilots in process industry. A roadmap should be developed for all the different sectors in the process industries to take full advantage of AI and big data and give clear and pragmatic recommendations for researchers, managers, and operators planning to harness their potential.

The roadmap should explore, inter alia, actions on:

• Research and innovation management, planning, and design (e.g. new chemical synthesis strategies, health and safety assessments);
• Process control: yield and accuracy enhancement;
• Supply chain management and scheduling of connected processes, plants and/or sites (e.g. for industrial symbiosis), process flexibility;
• Predictive maintenance;
• Product customisation and product traceability.
The Commission considers that proposals requesting a contribution from the EU between EUR 0.4 and 0.6 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 impacts of the CSA are, through a roadmap identifying and developing strategies:

- Better exploitation of AI potential for all the different sectors in the process industries, and strategies for developing AI applications, including the generation of data;
- Identification of existing and future data requirements for the development of data driven technologies (e.g., ontologies and data formats, how to handle data heterogeneity, data availability, quality and reliability, access and platforms, security and confidentiality);
- **Seamless collaboration of human operators with process control systems and plants:** acceptance, identification of skills gaps and ethical, legal & social implications (ELSI);

Implementation and further elaboration of the strategic research and innovation agenda announced in the EC Communication on Artificial Intelligence.

**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.*

**Other Actions**

8. **Educational Materials Set for promoting advanced materials in education**

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<th>SwafS Key Word(s)</th>
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The aim of the Educational Materials Set is to raise awareness amongst the general public of the importance and benefits of research and innovation in the field of materials. Boxes containing objects/samples showing materials research progress and its potential should be designed and made. Hands-on experiments and explanations of why materials behave as they do should increase sensitivity to and awareness of material research and innovation. The boxes should appeal in particular to children and young people but it should also have a large impact on the general public.

Similar promotional material was realised with a previous call for tenders. Details about "The Secret Materials box" are available online at: [https://ec.europa.eu/info/files/secret-materials-box_en](https://ec.europa.eu/info/files/secret-materials-box_en)
The objective is to supply interesting and novel materials. Any potential tenderer does not have to follow the previous format and is encouraged to take into account the progress in materials research in the last few years.

**Type of Action**: Public Procurement - One direct service contract

**Indicative timetable**: Second quarter of 2020

**Indicative budget**: EUR 0.06 million from the 2020 budget
Call – Space 2018-2020

DT-SPACE-01-EO-2018-2020: Copernicus market uptake

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**Specific Challenge:** Copernicus, the Union’s Earth observation and monitoring programme produces a wealth of data and information services on the Earth, its lands, atmosphere, oceans and inland waters, as well as on climate change and in support of disaster management and security. **Copernicus data and information services are available with a free and open data licence.**

Copernicus data is an integral part of the European Data Economy. Europe needs to strengthen its position as provider of products and services based on data, enabling new market opportunities.

Copernicus data value will be greatly enhanced by its integration with data assets contributed by other vertical domains (i.e. not necessarily from the space/geospatial sector) as well as by leveraging the synergies with EGNOS/Galileo to seize new market opportunities. Many vertical domains, other than space, can benefit from the use of Copernicus.

Mature software technologies such as big data processing and linking technologies, machine learning and artificial intelligence, are widely developed also within the LEIT-ICT Work Programmes of H2020, shall be adopted to offer user-friendly solutions at the scale of the large quantities of data involved. They shall be adopted to contribute to the digitization challenges of the European industry by opening up innovative business avenues and to support societal challenges.

Real-world industrial/commercial requirements, or societal needs, shall drive the Innovation Actions so that the projects’ results can find their logical path towards market adoption.

**Scope:** Actions under this topic should be instrumental to help European companies innovate, develop and bring to market new or improved products and services **by exploiting Copernicus data assets** and, whenever relevant, the link with European satellite positioning/navigation/timing technologies.

Copernicus data will be at the core of the data value chains and integration activates needed to fulfil the industrial requirements that will drive the proposals.

Proposals should adopt state-of-the-art ICT technologies, such as big data processing and linking technologies, machine learning and artificial intelligence to address the challenges of making sense of large volumes of diverse data from distributed sources, at the scale required to address European and global challenges.

Proposers are strongly encouraged to make use of existing European data infrastructures such as (but not limited to) Copernicus’ DIAS platforms, European open data portals, industrial data platforms, and explore synergies with EGNOS/Galileo signals and services whenever those are relevant. Use and re-use of existing data and computing assets is also strongly recommended.
The participation of industry is required to define the project’s industrial requirements from the very beginning of the action and to take ownership of the results. **End users (i.e. professional experts and decision-makers as opposed to researchers or software developers) should also be involved to rigorously test the project’s solutions to make sure the human factor is considered appropriately.**

Proposals must demonstrate that they have access to appropriately large, complex and realistic data sets, in addition to Copernicus. The data assets to be used in the Action should be described in the proposal. Solid, quantitative and innovative business models should support the proposal giving evidence of the expected industrial, commercial, or societal benefit, and demonstrating a plan towards sustainability after the project’s end.

A clear distribution of IPRs amongst the members of the consortium is expected. For proposals under this topic:

- The participation of at least one industrial partner is mandatory, and the participation of SMEs and start-ups is encouraged;
- Involvement of post-graduate scientists, engineers and researchers and promotion of gender balance is also encouraged, for example through professional work experience or through fellowships/scholarships as applicable;
- A business plan and evidence of user engagement is compulsory and is to be provided as part of the proposal, to demonstrate the user need and sustainability of the project

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 and 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:**

- Establishment of new sustainable data value chains with Copernicus data at their core with a commercial value;
- Substantial increase in the market of the number of products and services enabled by integrating Copernicus data across sectors with state-of-the-art innovative technologies, able to generate growth and new jobs;
- Enhance European industry’s potential to take advantage of market opportunities and establish leadership in the field, as well as boost business activity;
- Increased market share for European companies in the supply of innovative geospatial products and services.

**Type of Action:** Innovation action

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*
LC-SPACE-18-EO-2020: Copernicus evolution: Research activities in support of the evolution of the Copernicus services

SwafS Key Word(s) | Citizen Science, Open Access/Open Data
---|---
Deadline | 05 March 2020 17:00:00 Brussels time
Topic Information | Link

**Specific Challenge:** Copernicus operational services are not static, but need to evolve with recognised and emerging user requirements and EU policies.

R&D activities which are suitable for this call are identified to this end by the Commission, together with the Entrusted Entities, for each service. The challenge is to clearly demonstrate if and under which conditions an evolution of the operational service portfolio is appropriate and in line with the Copernicus Programme.

**Scope:** The proposal should tackle only one of the following sub-topics. For the chosen sub-topic the proposal should clearly identify one (or more) core product(s) to be developed as a completely new or improved product.

The Commission, together with the Entrusted Entities, has identified for each service (sub-topic) the areas of Copernicus R&D interests:

1. **Copernicus Emergency Monitoring Service (CEMS):** resilience to climate risk, population exposure risk (e.g. in coastal areas, flood prone areas, areas exposed to droughts...). The proposed activities need to consider the existing CEMS framework and describe how they can contribute to a fully integrated risk cycle monitoring service.

2. **Copernicus Monitoring Atmosphere Service (CAMS):** Up-to-date emissions of reactive gases and aerosol based on inverse modelling, Improve atmosphere monitoring using data assimilation and preparation for upcoming sentinels (with a focus on Sentinel-4), Integrated soil-vegetation-atmosphere modelling and data assimilation for representing emission and deposition of atmospheric pollutants.

3. **Copernicus Climate Change Service (C3S):** exploitation of seasonal forecasting systems as natural integrator of Copernicus Services, enhancement of predictive skills at seasonal timescales, consistent climate re-analysis of the Earth system, improvement in predicting variations of the climate system over the next few years and decades, linkages between current extreme weather events such as droughts, heat waves or floods to anthropogenic climate change and/or natural climate variability.

4. **Copernicus Marine Environmental Monitoring Service (CMEMS):** Advanced marine data assimilation techniques for physics (e.g. ensemble methods, assimilation of future satellite observations like swath altimetry and surface currents), improvement of biogeochemical products for the carbon cycle (CO2 ocean component), water quality and food security (food web modelling, habitats), with assimilation of satellite and in-situ data, improved biogeochemical models, coupled physics and biogeochemistry models and use of new in-situ observations (e.g. BGC Argo) to validate biogeochemical models.

5. **Copernicus Land Monitoring Service (CLMS):** essential ecosystem variables for natural capital accounting, HRL for agriculture, forest and urban monitoring, CLC+, environmental compliance, support to sustainable development goals, exploitation of mid and high resolution satellite combination for continuous environmental change monitoring.
6. Security New concepts for applications based on the integration of relevant information derived from space or non-space sources, current services or other value-added applications, targeted to support civil protection and security. New algorithms for automated monitoring and detection of changes and patterns of life. Those activities should also aim at bridging the gap between demand and supply, complementing the offer of the Copernicus Security services and enlarging its user base.

Actions should take into account the existing portfolio of the services and clearly define to what extent main model, algorithm, tool and technique should be improved to generate new or better products.

Actions aim at demonstrating the technical operational feasibility of the selected product(s). The proposed development should be modular and scalable. The project should provide a proof-of-concept or a prototype (e.g. system element) demonstrating the feasibility of the integration in the existing core service. This new “system element” should also guarantee the expandability required for the integration of new data from potential space or no-space new mission/sensors.

During the development of the project, the team taking into account the delineation between Copernicus core services and downstream services, should clearly identify the right context of the proposed product(s). The border delineation takes into account the principles of subsidiarity and proportionality, the avoidance of duplication, and the facilitation of user uptake.

The proposal should also investigate to what extent the proposed evolution could be a candidate for the operational Copernicus service in terms of cost-benefits, calendar and operational feasibility.

R&D activities should aim at a better integration of space research with other non-space domains (e.g. citizen science including social media) focusing in particular on policy areas addressing global and societal challenges highlighting horizontal synergies and multidisciplinary approaches. In particular, proposals should clearly mention which of the UN Sustainable Development Goals the project will support.

New IT tools should be considered and innovative solutions should be proposed for a better data exploitation, processing and distribution, e.g.: cloud and HPC computing, distributed computing, Artificial Intelligence, machine learning (e.g. for automatic feature recognition), ensemble modelling, model coupling & nesting, software as-a-service.

Additionally, the operationalisation of the research results should receive active attention during the course of the project to strengthen the readiness for an operational deployment in the future, including the conditions for making available, for re-use and exploit the results (including IPR) to the entities implementing the EU Copernicus programme. The software should be open licensed in order to use, copy, study, and change it in any way.


It should be noted that funding of the H2020 project in no way commits the Commission or the Copernicus service operators to deploy the outcomes from the research in the Copernicus operational services.

For proposals under this topic:

- Participation of industry, in particular SMEs, is encouraged;
• Involvement of post-graduate scientists, engineers and researchers and promotion of gender balance is also encouraged, for example through professional work experience or through fellowships/scholarships as applicable. At least one proposal per sub-topic shall be selected for funding. The Commission considers that proposals requesting a contribution from the EU of between EUR 1 and 1.5 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:
• Increased coverage of EU policies, clearly identifying which and how the project intends to address them;
• Integration of different observation capacities with a clear demonstration of an increase in the service performance (compared with the existing one);
• The proposed proof-of-concept or prototype, as outcome of the project, should clearly demonstrate an improvement of the Copernicus service evolution.

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.
SwafS Opportunities

Societal Challenges

Societal Challenge 1: Health, demographic change and wellbeing

Call - Better Health and care, economic growth and sustainable health systems

SC1-BHC-06-2020: Digital diagnostics – developing tools for supporting clinical decisions by integrating various diagnostic data

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Specific Challenge: The availability of appropriate decision support tools for healthcare practitioners can promote uptake of personalised medicine in healthcare. There is a need to carry out research activities aiming to develop and validate such decision tools that would integrate available and/or emerging diagnostic means for the area concerned, enabling increased precision of diagnostics and clinical decision making. Ongoing progress in the fields of bioinformatics and biostatistics, advanced analytical tools (e.g. machine learning) up to Artificial Intelligence (AI) solutions, should make possible the development of devices, platforms or novel approaches leading to highly personalised diagnosis, based on the integration of data available from various sources. The ultimate result would be a detailed health status assessment from a multitude of viewpoints, in a systemic way and easy to use for clinical purposes, leading to better diagnostic accuracy, increased effectiveness and efficiency of treatments. Novel hardware enabling truly innovative, integrative diagnostic platforms can also be considered.

Scope: Proposals should develop tools, platforms or services that will use information provided by most relevant diagnostic means for a particular area, resulting in an accurate, detailed, structured, systemic and prioritised assessment of the health status in a patient. The proposed solutions should integrate various data sources such as medical records, in vitro and/or in vivo diagnostics, medical imaging, -omics data, functional tests (lab-on-a-chip) etc., while taking into account the actual needs of healthcare practitioners, and should be tested and validated in real-life settings in pilot centres, facilitating future Health Technology Assessment. These tools/platforms/services should contribute to improving diagnosis and clinical decision, not only integrate existing data, and should involve intelligent human-computer interface solutions to facilitate its daily use in clinical practice. Any medical data relevant for a particular disease (textual data, numerical measurements, recorded signals, images etc.) may be considered. The aim is to steer the development of solutions towards concrete patient and public sector needs, having the citizen and healthcare providers at the centre. Careful attention should be paid to appropriately addressing ethical and legal concerns, providing adequate information to health professionals and patients to support informed decisions, and ensuring data safety and privacy, in line with existing European and international standards and legislation. Gender and sex differences should be taken into consideration when relevant.
The Commission considers that proposals requesting a contribution from the EU of between EUR 8 and 15 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting different amounts.

**Expected Impact:**

- Increase EU’s capacity to innovate in the area of medical instruments technologies through the development of new diagnostic tools, platforms or services integrating various diagnostic data and providing quick, detailed, accurate and highly personalised diagnostics for optimal decision in clinical practice.
- Improve the quality and sustainability of healthcare systems through quicker and more encompassing diagnosis of medical conditions, leading to quicker and better clinical decisions and timely delivery of effective personalised treatments, with reduction of errors and delays (and costs associated to them).
- Contribute to the growth of the European diagnostics sector, in particular for SMEs.
- Reinforce EU’s role among world leaders in the production of medical diagnostic devices.

**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.*


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**Specific Challenge:** Personalised Medicine is a very broad and multifaceted area where success relies on a well-functioning collaboration between several disciplines and different actors. While great advances have been made in some fields of medicine, in particular in stratification of cancer patients and in addressing rare diseases, most of today's healthcare protocols do not include personalised approaches apart from occasional division into broad age groups (children/adults/elderly), sex or ethnicity. Furthermore the prevention aspect of personalised medicine, i.e. identifying individuals prone to develop certain diseases, is largely isolated from treatment options. As is the case for a relatively nascent field there is a need for standardisation of approaches, including for sampling, data storage, interpretation and data exchange and also for clinical trials design and reimbursement models. European countries with their social model of healthcare along with (in several cases) centralised cost reimbursement, are ideally placed to lead the way for an integrated health management system. Many needs for coordination and support activities have been identified by ICPeRMed, an EU Member States led initiative which includes representatives from most EU countries along with several other European countries, Brazil and Canada. The EC currently
supports ICPerMed with a grant to operate its secretariat until October 2020. Wider internationalisation of ICPerMed can be underpinned by coordinating networking activities with third countries.

**Scope:** Each action should focus on one of the following fields:

International aspect: The action should focus on building links with third countries by analysing the potential and advantages of collaboration in personalised medicine (PM) with those countries, studying areas of interest for Europe in PM collaboration and promoting international standards in the field. In particular the uptake of personalised approaches in health systems and healthcare should be addressed, taking into account social, cultural, ethical and legal aspects, health economy issues and equitable healthcare. For the 2018 call, the project should focus on CELAC as a group of countries, and for the 2019 call on China. For the 2020 call, the project should focus on countries in Africa, linking also into the EU-AU (African Union) policy dialogue and taking into account the new Africa-Europa Alliance for Sustainable investment and Jobs. Alignment with activities of the Global Alliance for Chronic Diseases (GACD) and The European and Developing Countries Clinical Trials Partnership (EDCTP) activities should be explored. Special attention should be given to prediction and prevention, and to promoting well-being for all at all ages. Furthermore, the project should seek to integrate local knowledge and practice. Data safety and privacy should be addressed in line with existing standards and legislation. The project should have a duration of at least four years and address sustainability beyond that to ensure longer term structuring effect. 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 one participant based in the international partner region; CELAC (2018 call), China (2019 call) and Africa (2020 call).

1. **Regional aspect:** The action should establish and support networking between regions and interregional cooperation in different European countries, in particular linking remote or sparsely populated regions with regions harbouring critical mass of medical and PM expertise while taking into account broader socio-economic and cultural aspects. The focus of the action can include aspects of genomic analysis, me-Health (mobile and electronic Health), telemedicine etc. but should aim at structuring PM application at regional level. Linkage to existing inter-regional projects (financed by INTERREG programmes) or interregional partnerships of Thematic Smart Specialisation Platforms will be actively encouraged. (2018 call).

2. **Healthcare- and pharma-economic models for personalised medicine,** interlinking European public health approaches with medical practice and financing. The action should carry out studies in support of research in and development of new health- and pharma economic models for PM, including prevention, to capture value and to develop relevant health financing models. Analysing mid- and long-term impacts of innovative products designated for sub-sets of patient populations on the patients themselves and on public health systems. Assessing the benefits of personalised medicine development for citizens and their broader social environment while ensuring patient safety, access, equity, solidarity, data safety and financial sustainability of public health systems in the EU. The action should involve different relevant stakeholders and take into account work being carried out by other EU funded initiatives, such as EUnetHTA. SME participation is encouraged. Results of the
studies and workshops should be actively disseminated to a wider audience, including relevant authorities, professionals and the wider public. (2018 call).

3. Standardisation for clinical study design. Establishment of innovative clinical trial design methodology for PM, including guidelines for research and reflection papers. The action should take into account sex/gender differences as well as the work done by relevant stakeholders and authorities such as EMA and the HMA network, as well as the European legal framework. SME participation is encouraged. The results of the studies and workshops should be actively disseminated to a wider audience, including, industry, researchers and other professionals. (2019 call).

4. ICPMed secretariat: The project should continue the work done by the secretariat for ICPMed, e.g. maintenance of existing services, organising the meetings of the ICPMed Executive Committee, convening dedicated workshops and preparing and issuing updates of the ICPMed Action Plan. Furthermore maintaining the network of policy makers and funders gathered in ICPMed and expanding the membership to new interested and complementary partners as well as maintaining communication with all EC funded activities related to ICPMed (2020 call).

For grants awarded under this topic for Coordination and Support Actions it is expected that results could contribute to European or international standards. Therefore, the respective option of Article 28.2 of the Model Grant Agreement will be applied.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1.5 and 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:** Contributing to the implementation and reach of the ICPMed initiative; furthermore:

1. International aspect: Integrating the country/group of countries into ICPMed activities. Support wider adoption of standards developed in Europe. Support the EU-AU policy dialogues relevant to research and health (2020 call). Contribute towards the UN Sustainable Development Goal 3: Ensure healthy lives and promote well-being for all at all ages.

2. Regional aspect: Strengthened links between European regions setting up or planning personalised medicine healthcare approaches. Aligning research funding with ongoing and foreseen investments e.g. from Structural Funds. Recommendations on best practice in implementing PM at regional level.

3. Healthcare- and pharma-economic models: Increased understanding of personalised medicine perspectives on how to capture value, develop institutional support and design relevant payment models. Recommendations for faster translation from discovery to patients’/citizens’ access. Contributing to understanding of trends and dynamics in the pharmaceutical markets in relation to increased emphasis of research and development efforts on PM. Suggestions on how savings through prevention can be included in payment and reward models and contribute to the sustainability of public health systems in the EU. Improved knowledge and understanding among healthcare professionals and the wider public of potential benefits of PM approaches.

4. Standardisation for clinical study design: Contribute to standardisation of PM clinical trial design. Demonstrate feasibility and importance of PM approaches. Underpin
accelerated market uptake. Improved knowledge and understanding among healthcare professionals, regulatory authorities and industry how best to adapt clinical trials designs to stratified patient populations.

5. **ICPerMed secretariat (2020 Call)**: Ensure continuity of the operations of ICPerMed beyond 2020. Increase the visibility of the consortium and ensure openness of the structure. Provide harmonised vision for the further development of personalised medicine. Contribute to the convergence of members’ approaches to personalised medicine and further alignment of research efforts in the field.

**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._

**SC1-HCO-03-2020: Bridging the divide in health research and innovation – boosting return on investment**

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**Specific Challenge**: The Innovation Union Scoreboard reveals significant disparities in terms of research and innovation performance among the different member states and regions within the European Union. The disparities are equally present in health research and innovation which unfortunately also translates into lower participation in the Union’s research and innovation framework programme, Horizon 2020.

There are serious efforts deployed at national and European level to help to close the R&I divide. Many instruments provide direct investment to organisations from lagging regions and countries, such as the European Structural and Investment Funds, national grants, the Spreading Excellence and Widening Participation programme of Horizon 2020 while others encourage networking such as the COST actions.

These European and national investments yield the most when beneficiaries have the necessary capabilities, adequate governance structure, and suitable science and HR policies. This call aims providing support in the health R&I domain to organisations from lower performing regions that are willing to carry out structural reforms to improve their R&I performance. The call builds on past efforts of the European Commission (especially the HCO-14 2014 and the HCO-08 2017 calls in H2020 SC1).

**Scope**: Applicants should propose actions that would shift benefiting organisations’ R&I performance and would eventually increase their participation in EU funded collaborative projects. Proposed activities should aim to strengthen research development; improve governance, managerial and administration practices; increase the organisations’ international profile; develop HR policies to attract and retain talents, taking into account gender aspects; and create a culture that rewards scientific performance and innovation. Applicants may propose any actions that contribute towards these goals.

Beneficiaries of the activities should be active in the field of health research and innovation and should come from low performing Member States/regions that have identified health
SwafS Opportunities

R&I as a priority in their Research and Innovation Strategies for Smart Specialisation (RIS3). Applicants shall seek synergies with European Structural and Investment Funds, with European and national research and innovation programmes and if applicable with EEA and Norway grants. Applicants are encouraged to leverage funding of this call with other resources.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1.5 and 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**: An increased number of organisations from low performing Member States/regions among the top international health R&I institute that are able to attract funding and talents and render these resources into scientific excellence and innovation. Ultimately, increased participation rate of low performing countries in the EU’s Research and Innovation Framework Programme.

**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.*

**SC1-HCO-17-2020: Coordinating and supporting research on the human microbiome in Europe and beyond**

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**Specific Challenge**: Integration and application of metagenomics data from the human microbiome has shown large potential for personalised medicine approaches, although causal relationships and confounders are still largely unknown. Comparable information and details about microbiome composition and functionality in healthy citizen and patients are very valuable to complete the picture i.e. to better understand the healthy microbiome and to predict its development.

The number of European and international projects and initiatives is increasing but their results and data cannot be properly compared as they have different underlying methods, standards and operating procedures. The International Human Microbiome Consortium (IHMC) as well as other current initiatives aim to strengthen international cooperation, to increase data comparability and to agree common standards, procedures and methods. There is a need to avoid having the same research carried out multiple times at different places and to better agree at European and at international level. This collaboration should increase coherence and data comparability to better exploit existing microbiome data and clinical information in a standardised way.
Scope: Proposals should aim for synergistic collaboration and agreement across various research and innovation programmes on the human microbiome, in Europe and worldwide, dealing with sample collection, processing, standardisation and healthy states references at different sites of the human body (not only one organ), including also interaction with omics, impact of drugs, nutritional and environmental aspects as well as sex and gender differences. In particular, they should support the agreement of concrete references of healthy human metagenomes across various different populations. Proposals should map the progress and the state of play for specific disease and health issues as well as the success and meaningfulness in different countries. They should propose concrete and strategic research actions on the human microbiome addressing gaps, emerging fields and political priorities. They should complement, support and enhance cooperation in similar activities within Europe and beyond. In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged with relevant partners from outside the EU. Proposals should cover the whole spectrum of human microbiome research from patient data collection all the way to study reporting in publications, social, ethical and legal aspects. Proposals should avoid networking without output and provide appropriate indicators to measure its progress and impact.

The Commission considers that proposals requesting a contribution from the EU between EUR 1.5 and 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:

- International agreement on concrete methods, standards, procedures and in vivo models. Harmonisation and increased comparability of metagenomics, metabolomics and human microbiome data in Europe and beyond.
- International agreement on definitive references of healthy human metagenomes. These references should apply across various different populations and allow end-users and citizens to see which microbiome is clinically healthy.
- More meaningful results through collaborative synergistic collection of microbiome data from different directions. Improved coherence and reduction of overlap between national, EU and other funding in the area of human microbiome research, thus ensuring an efficient use of the available human and financial resources.
- Knowledge exchange and enhanced engagement of citizens, scientists and political stakeholders for priority health risks. Validated results will be delivered faster to people.
- Integration of metagenomics and human microbiome references into other multilateral cooperation areas or personalised medicine approaches.

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.
SC1-BHC-08-2020: New interventions for Non-Communicable Diseases

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**Specific Challenge:** Non-communicable diseases represent a significant burden on individuals and healthcare systems, accounting for 86% of all deaths in Europe. Innovative and effective healthcare interventions are required to find a cure or provide best quality of care when prevention strategies have failed. While considerable knowledge has been generated by biomedical research, potentially promising healthcare interventions often fail clinical validations and as a consequence do not reach patients.

**Scope:** Proposals should conduct early stage clinical trial(s) to validate novel or refined healthcare interventions for patients suffering from non-communicable diseases (Rare diseases and regenerative medicine are not within the scope of this topic). Clinical trial(s) should be supported by proof-of-concept of clinical safety and efficacy and may be investigator-initiated. Both preclinical research and the draft clinical trial protocol should be completed at the time of submission of the proposal. Applicants should present a sound feasibility assessment, including an appropriate patient selection and realistic recruitment plans, justified by publications or preliminary results. Proposals should demonstrate potential clinical benefit, including consideration of patient-reported outcomes when relevant. **Sex and gender differences should be considered;** age and other stratification criteria should be considered when relevant. **Where appropriate, patients and carers should be involved and their views reflected in research activities.** Proposals should demonstrate evidence of preliminary consultations with ethics and regulatory authorities at the time of submission.

The Commission considers that proposals requesting a contribution from the EU of between EUR 4 and 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:**

- Candidate healthcare interventions that would generate meaningful advances in clinical practice and care for patients with non-communicable diseases for late stage clinical trials.
- Potential to improve patient-centred outcomes and to impact on the disease burden of individual patients and health care systems following validation in late stage clinical trials.

**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.*
SC1-HCO-18-2020: Developing methodological approaches for improved clinical investigation and evaluation of high-risk medical devices

SwafS Key Word(s) | Gender Equality, Responsible Research and Innovation (RRI)  
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Deadline | 07 April 2020 17:00:00 Brussels time  
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Specific Challenge:

- In May 2017, a new Regulation on medical devices, Regulation (EU) 2017/745 entered into force that will come into effect in spring 2020. This new Regulation sets forth reinforced rules for the generation of clinical evidence: for instance, clinical investigations for high-risk devices will be compulsory and the requirements regarding the clinical evaluation throughout the product lifetime are more stringent.
- Medical devices have particularities that make the conduct of clinical investigations difficult. Taking into account these particularities, there is a need for methodologies that enable to generate improved clinical evidence. New developments in medical technologies such as mHealth, artificial intelligence, and combination products, pose additional challenges and opportunities for developers to generate high-quality clinical evidence.
- Owing to rapid scientific progress and lack of knowledge on the regulatory frameworks among the scientific community, there is a need to raise awareness on new regulatory requirements in terms of clinical evidence. It is important to ensure a smooth transition from the former directive to the new regulatory framework, especially with regard to clinical evidence, by informing stakeholders involved in the clinical evaluation of high-risk medical devices (e.g. academic researchers, clinicians, manufacturers, notified bodies, contract research organisations).

These challenges can be addressed by developing and promoting methodological approaches, including alternative statistical methodologies, adapted to the specificities of high-risk medical devices. These methodological approaches will improve the robustness of clinical data needed at different phases of the product’s lifetime, such as conformity assessment, post-market clinical follow-up, continuous clinical evaluation, post-market surveillance, and potentially relative effectiveness assessment.

Scope: To address these challenges, the proposals should focus on i) methods to generate clinical data both within the context of a clinical investigation and in daily practice (i.e. real-world data) so that robust clinical evidence is available for high-risk medical devices, and ii) aggregation methods that will allow to make optimal use of all available data taking into account its heterogeneity (e.g. meta-analysis methods using different statistical approaches, methods to combine data from different types of sources) and iii) promote exchange of best-practices and support network activities among developers. Proposals should in particular:

- Analyse the particularities of high-risk medical devices and the potential resulting problems with regard to clinical evaluation, carry out a review of the currently used clinical investigation designs for the evaluation of such devices, provide a hierarchy of these approaches, identify gaps to be filled (in particular in view of new developments like e.g. mHealth, artificial intelligence, and combined products) and derive
recommendations for the choice of clinical investigation methodology to obtain sufficient evidence.

- Develop methodologies for generating clinical data on high-risk medical devices enabling to collect sound data and to use data from different sources including real-world data. These methodologies should be adapted for the needs of conformity assessment and for continuous clinical evaluation throughout the lifetime of the device. Proposals should take into account the various specificities of high-risk medical devices and therapeutic areas if relevant.
- Contribute to the exchange of best practices among notified bodies with regard to the assessment of clinical data as provided by developers of high-risk medical devices.
- Support networking activities among developers and in particular academic centres with regard to regulatory requirements for assessing high-risk medical devices and foster a pool of scientific expertise on clinical evaluation of high-risk medical devices.

Applicant consortia should bring together partners with relevant expertise from e.g. academia, competent national authorities, centres of expertise for clinical research and care, scientific and medical learned societies. The consortium should also seek input from relevant stakeholders such as technology developers, healthcare providers, health technology assessment agencies and patients, with special regard to endpoints that are relevant for patients. The composition of the consortium should ensure a broad geographical representation of European countries. Sex and gender aspects should be taken into account in carrying out the relevant activities.

Proposals should complement or build on existing work, including results of EU-funded research projects and Joint Actions in the field of medical devices evaluation, and related activities, like e.g. those of the Competent Authorities for Medical Devices (CAMD) and the successor Medical Devices Coordination Group (MDCG).
Proposals could consider the involvement of The European Commission Joint Research Centre (JRC) to provide added value regarding aspects like interfacing among the different stakeholders (e.g. developers and regulatory bodies) or contributing to European and international harmonization. In this respect the JRC is open to collaborate with any successful proposal.
The Commission considers that proposals requesting a contribution from the EU of between EUR 1 and 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amount.

**Expected Impact:**

- Higher quality and reliability of clinical data needed for conformity assessment and continuous market access
- Improved knowledge of relevant legislative frameworks and regulatory requirements among all stakeholders involved in the development of high-risk medical devices
- Improved evidence on safety and efficacy of high-risk medical devices for the benefit of the patient and health systems.

**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.

SC1-HCO-19-2020: Reliable and accessible information on cell and gene-based therapies

**SwafS Key Word(s)***
- Gender Equality
- Public Engagement
- Responsible Research and Innovation (RRI)
- Science Communication

**Deadline**
07 April 2020 17:00:00 Brussels time

**Topic Information**
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**Specific Challenge:** Cell and gene-based therapies have the potential to treat many debilitating diseases and conditions. However, the pace of their clinical development does not meet public expectations. They face difficulties reaching patients because *inter alia* the complexity and costs of product development, regulatory hurdles and the non-harmonized procedures for reimbursements. In addition, there are concerns over patient safety due to the use of unproven treatments.

**Scope:** Proposals should offer well-structured and detailed strategies to convey accurate and up-to-date information on cell and gene-based therapies using multiple contemporary modalities, including a website. The consortium should consist of diverse actors and could include experts in science communication, patients’ representatives, industry, SMEs, clinical and academic researchers as well as the major European learned societies in the field. They should provide expertise across the field of human stem cells, regenerative medicine, genome editing and gene therapy. All communication material/information should be translated to English and proposals should provide a detailed strategy on the linguistic approach of dissemination in order to reach a large EU audience. The website should be user-friendly and should contain tailored sections dedicated to at least researchers, patients, and the public.

For broader audiences proposals should create a reliable, transparent, accessible resource for patients to make informed decisions and for citizens to have access to scientifically viable information on cell and gene-based therapies, including sex and gender aspects when relevant. Proposals should provide state-of-the-art strategies to engage the public and foresee regular evaluation of whether they reach the targeted audiences. In addition, a series of communication events should be organised, also open to the public, where innovative technologies could be presented and discussed.

For the research community, proposals should create an information source on the practical steps needed for cell and gene-based therapy development. Proposals should provide a one-stop shop on where to seek further information and guidance relating to manufacturing guidelines, regulatory requirements, intellectual property rights, market acceptability and ethical matters. Proposals should provide a strategy on how they will liaise with regulatory agencies (e.g. national agencies, the European Medicines Agency (EMA), the Heads of Medicines Agencies (HMA) network, EUnetHTA network). Finally, proposals should include a realistic sustainability plan which explores how the ownership of the information will be structured, and propose a defined organisation to take responsibility, manage and administer the information, and to which authorities/organisations the information will be delivered at the end of the project. Sustainability should be ensured for at least 5 years after the end of the project.
The Commission considers that proposals requesting a contribution from the EU between EUR 1.5 and 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:**

- Better informed decision making by patients and the public, due to objective, accurate and transparent communications of the latest developments and actual treatments available in the field in order to avoid misconceptions.
- Better informed decision making by regulatory and healthcare authorities, due to better access to reliable and updated information, and to stronger synergies and knowledge sharing between decision-makers and other stakeholders including advanced therapies learned societies.
- Improved products development, by providing the research community and patients with a high-quality information source.

**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.*

**SC1-BHC-17-2020: Global Alliance for Chronic Diseases (GACD) - Prevention and/or early diagnosis of cancer**

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**Specific Challenge:** The Global Alliance for Chronic Diseases (GACD) call will focus on implementation research proposals for the prevention and/or early diagnosis of cancer in Low and Middle-Income Countries (LMIC) and/or in vulnerable populations in High-Income Countries (HIC).

The world is facing a critical healthcare problem due to ageing societies, unhealthy lifestyles, socio-economic inequalities, and a growing world population. Cancer is becoming one of the most important public health problems worldwide. In 2018, it is estimated that 181 million people have been diagnosed with cancer and 9.6 million have died from it. Predictions suggest that 30 million people will die from cancer each year by 2030, of which three-quarters in low- and middle-income countries (LMICs).

With an estimated 30-50% of avoidable cancers, it is a leading cause of premature death, reducing a country’s productivity. Current cancer prevention and control do not fully reflect ethnic, cultural, environmental, socio-economic and resource differences. In particular, limited implementation research is conducted on cancers primarily found in LMICs and vulnerable populations in HIC. In order to achieve the United Nations' sustainable
development goal 3.4, implementation research and healthcare efforts are needed to prevent and control cancers in these countries and populations.

Scope: Proposals should focus on implementation research for the prevention and/or early diagnosis of cancer on in LMIC and/or in vulnerable populations in HIC. Proposals should build on interventions with promising or proven effectiveness (including cost-effectiveness) for the respective population groups under defined contextual circumstances. For promising interventions, a limited validation period can be envisaged. However, the core of the research activities should focus on their implementation in real-life settings. The proposed interventions should gender-responsive.
The aim should be to adapt and/or upscale the implementation of these intervention(s) in accessible, affordable and equitable ways in order to improve the prevention and early diagnosis of cancer in real-life settings. Interventions should meet conditions and requirements of the local health and social system context and address any other contextual factors identified as possible barriers.

Each proposal should:

Focus on implementation research addressing prevention, and/or early identification strategies derived from existing knowledge about effective and/or promising interventions. For screening interventions, the pathway to referral for positive cases should be included.

Include a strategy to test the proposed model of intervention and to address the socioeconomic and contextual factors of relevance to the targeted region and community. Lead to better understanding of key barriers and facilitators at local, national and international level that affect the prevention and/or early diagnosis of cancer. Include health economics assessments as an integral part of the proposed research, including considerations of scalability and equity. Propose a pathway to embed the intervention into local, regional or national health policy and practice, addressing:

A strategy to include policy makers and local authorities (possibly by being part of the consortium), as well as other relevant stakeholders such as community groups, patient groups, formal and informal carers and any other group, where ever relevant from the beginning of the project, which will contribute to the sustainability of the intervention, after the end of project.

Relevance of project outcomes/evidence for scaling up the intervention at local, national and international level and then scaled-up appropriateness with respect to the local social, cultural and economic context.

Research under GACD involves regular exchange of research findings and information across participating projects by means of cross-project working groups and annual joint meetings. Wherever feasible, projects should harmonise and standardise their data collection and exchange data. Applicants must budget for annual costs of having two team members participate in one annual face-to-face meeting of the Annual Scientific Meeting (location to vary annually). Applicants must budget their involvement in GACD working groups and other GACD wide activities, beyond their projects.
The Commission considers that proposals requesting a contribution from the EU of between EUR 1 to 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 proposals should address one of or combinations of:

- Advance local, regional or national cancer prevention and/or early diagnostic health policies, alleviating the global burden of cancer;
- Establish the contextual effectiveness of cancer intervention(s), including at health systems level;
- Improve tailored and affordable prevention and/or early diagnosis;
- Provide evidence and recommendations to national programmes and policies focusing on prevention, screening, and/or early diagnosis;
- Inform health service providers, policy and decision makers on effective scaling up of cancer interventions at local, regional, and national levels, including affordability aspects for users and health providers;
- Reduce health inequalities and inequities, including due consideration of socio-economic, gender and age issues where relevant, in the prevention and/or early diagnosis of cancer at both local and global levels;
- Provide pathway to cancer care for the patients diagnosed with cancer;
- Maximise the use of existing relevant programmes and platforms (e.g. research, data, and delivery platforms);

**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.

**SC1-BHC-20B-2020: Public procurement of innovative solutions (PPI) for diagnostics for infectious diseases**

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**Specific Challenge:** Implementation of timely and correct diagnostics for infectious diseases (ID) that will speed up the identification of the causative infectious disease pathogens, possible drug resistances and drug susceptibility is crucial for tailoring the antimicrobial treatment, thus ensuring appropriate antimicrobial drug use. A combination of rapid, accurate and specific diagnostics and correct treatment promises not only to reduce caseloads of multi-drug resistant infections, but also to limit public spending for necessary isolation and hospitalisation by early and correctly identifying the appropriate treatment. In practice however, cost issues hamper the implementation of rapid diagnostics for ID in public health institutions, as innovative rapid diagnostics are still significantly more expensive than culture-based diagnostics. This issue and the lack of consideration of total...
cost of care limits the uptake of innovative rapid diagnostics in hospitals, which could result in a continued unspecific use of antimicrobials, prolonged hospitalisations and a non-patient centred provision of care.

**Scope:** This topic will contribute to the EU One Health Action Plan on Antimicrobial Resistance and should specifically consider the following:

- Development of proposals for ‘Public Procurement of Innovative Solutions’ for the implementation of rapid diagnostic tools for infectious diseases in clinical practice. Proposals should be driven by clearly identified procurement needs of the participating organisations. In order to ensure compatibility and interoperability between infectious disease diagnostics and avoid technical/technology standardisation issues, public health procurers should also develop specifications that are applicable for EU-wide deployment of the innovative diagnostics.

- Applications should be driven by public and/or private procurers from each participating country (at national, regional or local level) that have responsibilities and budget control in the relevant area of supply of health and care services. They should demonstrate the applicability of the ‘Most Economically Advantageous Tendering’ approach in cross-border collaboration of public procurers in the EU, defining specific outcome criteria of importance for patients well-being, and for innovation of public procurement in the area of infectious diseases and AMR, taking also into account overall economic and societal benefits, and sex and gender differences when relevant.

- Proposals should include clear communication and outreach strategies aiming to actively promote and support public health procurement organisations and health care providers across regions and borders of the EU in adopting relevant innovation procurement approaches. They should specify measures that will ensure the sustainability of solutions beyond the lifespan of the proposed project.

- Synergies with the Structural Reform Support Program and the European Structural and Investment Fund are encouraged.

Activities covered should include cooperation with policy makers to reinforce the national policy frameworks and mobilise substantial additional national budgets for PCP and PPI, searching support and collaborating with respective coordination and networking projects, e.g. PIPPI and HCO-12. Likewise, awareness raising, technical assistance and/or capacity building beyond the project to mainstream PPI implementation and removing obstacles for introducing the innovative solutions to be procured into the market could be included.

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

**Specific requirements for PPI actions are described in part E of the General Annexes of the Work Programme.**

**Expected Impact:**

- Implementation of innovative procurement practices for diagnostics for infectious diseases in the EU, based on the ‘most economically advantageous tendering’
approach and involving newly acquired rapid diagnostic tests in hospital and ambulatory settings.

- Contribute to the EU One Health Action Plan on Antimicrobial Resistance, in particular in relation to ‘Better Prevention and Control of AMR’ and the goal to address patient safety in hospital environments by supporting good practices in infection prevention and control.
- Create new opportunities for market uptake and economies of scale for the supply side of rapid diagnostics in the area of respiratory tract infections across the EU.
- Reduced fragmentation of demand for innovative solutions.

**Type of Action:** Public Procurement of Innovative solutions

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

**SC1-BHC-33-2020: Addressing low vaccine uptake**

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**Specific Challenge:** Vaccines are one of the most important medical breakthroughs in the last 100 years. Every year vaccines save millions of people around the world from illness, disability and death, and they continue to be one of the most cost-effective ways to increase the health and wellbeing of their citizens. Despite this, vaccination uptake faces significant challenges across Europe, and these have increased in particular over the past 20 years. Recent studies have shown Europe to be the world region with the most negative views towards the safety and effectiveness of vaccines, and the importance of childhood vaccination.

Recent figures on collected by the World Health Organization (WHO) show that in 2016 only one vaccine had a coverage rate of over 95% in Europe. Seasonal influenza vaccination also remains significantly below the 75% coverage target for older age groups. Thus, coverage for many vaccines is below the recommended limit. Due to the low vaccine coverage rates, several EU Member States have faced considerable outbreaks of vaccine-preventable diseases in recent years. For example, more than 14,000 cases of measles were reported across the EU in 2017, which is more than three times the number of cases reported in 2016. During the same period 50 people in the EU died due to measles.

These figures highlight the urgent need to get to grips with vaccine uptake issues, whether uptake of existing or new vaccines. Research has an essential role to play in understanding the underlying causes of poor vaccine uptake, including vaccine hesitancy, and to develop strategies and guidelines to help Member States and Associated countries increase vaccination coverage. A detailed understanding of the obstacles to, and drivers of, vaccination uptake in various settings is necessary to provide appropriate recommendations.
Scope: Proposals should work to increase understanding of the determinants of low vaccine uptake in specific contexts situated in the EU and/or Associated Countries (AC), and should develop strategies to increase vaccination rates of essential vaccines within these contexts. From this work, proposals should aim to develop a series of recommendations that national and regional public health authorities in the EU and/or Associated Countries could implement in order to increase vaccine coverage. Proposals should build on existing research, findings and available information in this domain, as well as existing guidelines and recommendations from public health authorities, including those from the European Centre for Disease Prevention and Control and WHO/Europe (such as ECDC reports and guidance on vaccine coverage and hesitancy, "WHO/SAGE Working Group on Vaccine Hesitancy", WHO/Europe "Guide to tailoring immunization programmes (TIP)").

The approach taken should include a detailed examination of the causes of reduced vaccine uptake, and the design and testing of one or more interventions to improve vaccine uptake. Factors influencing vaccine uptake such as access, inequality, social/cultural influences and vaccine/vaccination-specific issues in specific population(s) that are identified as having lower than average vaccination coverage should be examined. Interventions to improve vaccine uptake should be based on existing high-quality research findings, with a sound hypothesis for why the chosen intervention(s) could be effective at increasing vaccine coverage in the target population(s). These interventions could be made in a wide variety of ways, for example content and style of online or offline media, educational material, modification of primary healthcare practices, access to vaccination, incentivisation, or any other strategies that are supported by a strong hypothesis. Also, the proposals should include a strategy for measuring the impact/success of the proposed interventions.

Finally, the findings of the project will be gathered into a clear and coherent set of recommendations that can be readily utilised by public health authorities in Europe to improve vaccine coverage. Proposals should include in their work the development of a strategy to ensure the implementation of these guidelines.

Proposals should take into account the specific contexts of the population(s) that they are studying, including factors such as age, sex/gender, religion, politics, geography, and socio-economic situation. Proposals should include partners from social science and public health-related disciplines. Proposals will also be expected to create links with other existing initiatives, both in Europe and internationally. This should include specific budget for networking, travelling to or organising meetings for researchers and other stakeholders that work on vaccine uptake challenges.

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 and 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:

- Contribute to increasing vaccine coverage in Europe, in particular in specific populations with low vaccine uptake and in specific contexts.
• Develop practical and readily implementable guidelines to aid national and regional public health authorities in the EU and Associated Countries to increase vaccination rates.
• Work towards meeting the goals on vaccination set out in President Juncker’s State of the Union address in September 2017, the EC Communication on strengthened cooperation against vaccine preventable disease (COM/2018/245)|128 and the Council Recommendation on strengthened cooperation against vaccine preventable diseases).

**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._

**SC1-BHC-34-2020: New approaches for clinical management and prevention of resistant bacterial infections in high prevalence settings**

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**Specific Challenge:** Antimicrobial resistance represents a serious threat to public health in Europe and beyond. Within the last decades resistance has increased considerably in many clinically important pathogenic bacteria. Data collected by the European Centre for Disease Prevention and Control (ECDC) shows that nowadays in several European countries prevalence levels of infections that can no longer be treated with last-line classes of antibiotics have reached levels where isolation measures may no longer be feasible. In addition to this, prevalence levels of resistant infections are likely to increase in countries where currently such levels are relatively low. This may lead to an increasing number of outbreaks of resistant infections in these countries. The challenge is to address this threat via a multi-disciplinary approach by developing suitable clinical management and infection prevention plans detailing how to deal with resistant bacterial infections in high prevalence settings. The spread of AMR across borders has been recognised globally and improving knowledge on clinical management and infection prevention in high prevalence settings might also benefit other countries around the globe, including low and middle income countries and thereby diminish the spread of resistant bacteria. This topic will contribute to the implementation of the EU One Health Action Plan against Antimicrobial Resistance.

**Scope:** Proposals should focus on the identification of best practices, and the development and validation of interventions, infection prevention and clinical management plans for dealing with resistant bacterial infections in high prevalence settings. The research needs to take into account the variety and capacities of local health care/nosocomial infrastructures, and the trends of resistance patterns on local, national and international level, as well as sex and/or gender differences, when relevant. Furthermore, research needs to lead to management plans that take into account commonalities as well as differences between different pathogens and resistance determinants.
The costs and benefits of the infection prevention and clinical management plans to be developed should be assessed as well as the feasibility of their implementation. Research into the practicalities and challenges to introduce such novel infection prevention and management plans is essential and their practical implementation, as pilot actions, in 2 or more European regions with high prevalence levels is strongly encouraged, while taking into account that the infection prevention and clinical management plans to be developed should be applicable for large geographical areas. The potential challenges in the uptake of interventions/management plans by national health systems should be researched and addressed and cooperation with the Joint action AMR and healthcare-associated infections (JAMRAI), ECDC and the EU Health Security Committee is recommended.

The Commission considers that proposals requesting a EU contribution of EUR 10-15 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:**

- Availability of tested cost effective models for prevention and treatment of bacterial infections in health care settings with high prevalence levels of resistant infections.
- Reduced spread of resistant hospital acquired infections in these settings.
- Knowledge that can be of use for other countries around the globe, including low and middle income countries, benefitting their local population and diminishing the global spread of resistant bacteria.

**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.*

**SC1-BHC-35-2020: Creation of a European wide sustainable network for harmonised large-scale clinical research studies for infectious diseases**

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SwafS Opportunities provides access to a large clinical research infrastructure for the design, coordination and conducting of clinical trials and studies. It should also respond to the Council Recommendation on strengthened cooperation against vaccine preventable diseases, which calls for the reinforcement and establishment of novel infrastructures to increase the effectiveness and efficiency of EU and national vaccine R&D funding.

**Scope:** Proposals should set up a European-wide multidisciplinary network able to provide a platform for a rapid response in the conduct of clinical studies in relation to any severe infection. The initial clinical studies to be performed should be included in the proposal, whereas criteria and processes for including further clinical studies in the project should be clearly described. This should include provisions for flexibility (including re-allocation of budget and de-prioritisation) in case of new scientific developments and in particular the need to address newly or re-emerging infectious diseases.

The proposed consortium should comprise expertise of stakeholders from academic organizations, SMEs, larger industry, patient organisations, ethics committees, public health bodies and regulators. It is expected to perform clinical studies and further advance clinical research in the field of infectious diseases. It should develop new, or make use of existing, standardised methodological approaches to rapidly perform large-scale clinical trials with the view of delivering optimal diagnosis and preventive or therapeutic interventions to patients affected by infectious diseases, taking into account sex and gender differences when relevant. Applicants should build on the results of successful European collaborative initiatives such as PREPARE and COMBACTE. Proposals should build on established structures for infectious disease clinical research at national or regional scales. To ensure the common benefit of the outcomes, it should also work in cooperation with existing global experts networks and infrastructures such as ECRIN and BBMRI. Proposals should in particular take into account the available result of the H2020-funded project ECRAID Plan (project resulting from SC1-HCO-08-2018). The network should address all aspects of clinical trial conduct, from study preparation and design, trial management and reporting. It should develop and allow for innovative research approaches and enable flexibility in responding to unpredictable events during its implementation. The sustainability of the network should be carefully worked out in the proposal. Furthermore, the network should create synergies with global initiatives, enabling quick and smooth interactions and collaboration across the world. Special attention should be given to EU Member States and Associated Countries with currently limited capacity to perform clinical trials.

The Commission considers that a proposal requesting an EU contribution between EUR 25 to 30 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amount.

**Expected Impact:**

- Reduced cost and time through efficiently implemented clinical trials for diagnosis, prevention and treatment of infections.
- Create and strengthen the operational capacity and the infrastructures for providing real-time evidence for optimal medical intervention and practice in infectious diseases.
• Contribute to existing EU policies, including the Council Recommendation on strengthen cooperation for vaccine preventable diseases, and the Communication “A European one health action plan against Antimicrobial Resistance (AMR)”.
• To ensure the EU’s worldwide leadership in controlling and responding to infectious diseases.
• Foster links between existing networks in Europe and other countries/regions in the world to optimise a coordinated response to infectious diseases for innovation and delivery of new preventive and therapeutic technologies.

**Foster collaboration between stakeholders from academic organizations, SMEs, larger industry, patient organisations, ethics committee, public health bodies and regulators.**

**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.*

**SC1-BHC-24-2020: Healthcare interventions for the management of the elderly multimorbid patient**

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**Specific Challenge**: It is estimated that more than 50 million European citizens suffer from multimorbidity. As the global population continues to grow and age, multimorbidity is increasingly prevalent in elderly patients. The management of multimorbid patients presents many challenges for Europe. As healthcare systems remain single-disease focussed, the optimal healthcare pathway for multimorbid patients is very complex. Healthcare costs associated with multimorbidity are high and rising. An estimated 55% of all healthcare costs are due to multimorbidity. Currently, there are limited means to address effectively the complex needs of multimorbid patients and caregivers. There is a lack of best practices. As a result, multimorbid patients suffer from inappropriate interventions, including delays in the care pathway, polypharmacy, adverse drug reactions, or non-adherence to treatments. This leads to a highly negative impact on the quality of life of individuals and is often associated with significant costs, some of which are avoidable.

**Scope**: Proposals should focus on interventions for effective, integrated patient-centred approaches, to improve the management of multimorbid elderly patients. Proposals should support the delivery of best care adapted to such patients. The patient-centred approach should be holistic, inclusive, cross-sectoral and interdisciplinary. Proposals should aim at improving the quality of life of the elderly patient, by targeting individuals, formal and informal caregivers and simplifying the care pathway of multimorbid patients, including through self-management. Proposals may stratify patients, develop the clinical concept of intrinsic capacity and use social innovation. Proposals should define quality performance indicators for the management of multimorbidity and aim to strengthen cooperation among
different health disciplines and medical specialties. **Sex and gender differences should be taken into account.** Aspects of independent living, fragmentation of treatment, polypharmacy, adherence to treatments may also be addressed. Health economics, cost effectiveness and inequalities should also be addressed.

The Commission considers that proposals requesting a contribution from the EU of between EUR 4 to 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:** Actions are expected to contribute to better management of multimorbid elderly patients and cost containment in healthcare interventions by addressing one or more of the following points:

- New validated, patient-oriented and stratified care pathways and healthcare models for the management of multimorbid elderly patients.
- New clinical guidelines and best practices for improved management of elderly multimorbid patients.
- Developed or modified quality key performance indicators for the management of multimorbidity.

**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.*

**SC1-BHC-37-2020: Towards the new generation of clinical trials – trials methodology research**

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**Specific Challenge:** Efficient and effective clinical trials are the primary means to provide scientific evidence to ensure optimal health interventions. Although the randomized controlled trial (RTC) design is regarded as the gold standard for evaluating the effectiveness of intervention in clinical research, there is a need for new trial methodologies that address current challenges such as:

- Globalization of clinical research;
- Use of emerging health technologies;
- Defining patient populations and patient enrolment strategies;
- Data management.

Given that all clinical research relies on voluntary contribution of patients, new designs may reduce the operational complexity, assure transparency and build trust, **meeting all ethics standards and protecting the individuals’ personal identity and privacy.**
Additionally, non-commercial trials often show suboptimal performance as compared to large commercial trials in terms of data collection, management and processing, good clinical practice compliance, and pharma covigilance, there is a need of a new methodology that improves their legislative compliance and encourage clinical trials conducted by non-commercial sponsors.

**Scope:** Proposals should focus on methodology research and develop innovative solutions to improve the design, conduct and analysis of clinical trials. Proposals should identify and validate methods that will improve the generalizability of evidence generated through differently designed trials, including personalized medicine approaches and combinatorial interventions. In order to draw meaningful conclusions following state of the art of statistical analyses, applicants need to demonstrate access to adequate clinical trial data sets that will be included into the proposed research.

The proposed methodology should allow sound extrapolation in various subgroups of disease of high public health burden as well as integration of RTC data and post-approval evidence generation. Furthermore, applicants should identify best practices to prevent bottlenecks in execution of clinical trial, including issues related to patient recruitment, adherence and compliance, governance, ethics, sex and gender-based analysis as well as data sharing.

The special attention should be put on non-commercial trials, including quantifiable indicators to measure the qualitative improvement in terms of trial management, data processing, and reporting. Whenever relevant, proposals should cover different aspects of training exercises, including hands-on trainings and closer monitoring of the scientific and technical staff involved in the conduct, management and analysis of the trial.

All literature analyses to define the current state of the art in the clinical trial methodology research must be completed at the time of submission of the proposal. Methodology research related to clinical studies exclusively on medical devices is not in the scope of this topic.

In this topic, the European Medicines Agency (EMA) and the Commission Expert Group on Clinical Trials will support the selected applicant consortium in the implementation of the action. Successful applicants under this topic are also expected to liaise with the successful applicants of the relevant coordination and support action (CSA) topics in order to exchange information, avoid potential overlapping activities, create synergies and support the CSA goals. To maintain the interactions with the CSA consortia, specific tasks and a dedicated budget should be foreseen in the proposal. Additionally, consultations with the European Centre for Disease Prevention and Control should also be envisaged as additional relevant activities of the successful proposals.

Please note that this topic will take the form of lump sums as defined in Commission Decision C(2017)7151 of 27 October 2017. Details of the lump sum funding pilot scheme are published on the Funding & Tenders Portal together with the specific Model Grant Agreement for Lump Sums applicable.

The Commission considers that proposals requesting a contribution from the EU of between EUR 4 and 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:**

- Improved relevance, quality and efficiency of clinical trials conducted with public funding.
- Potential to establish a novel clinical trial methodology supported by regulatory authorities.

**Type of Action:** Research and Innovation action Lump Sum

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

**SC1-HCO-20-2020: Coordination of clinical research activities of the European Reference Networks**

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**Specific Challenge:** European Reference Networks (ERNs) have been established under the Directive on Patients' rights in cross-border health care in view of tackling complex or rare diseases and conditions that require highly specialised diagnostic tools and treatments. ERNs in collaboration with other European initiatives will gain major research potential due to their network structure bringing together highly specialised multidisciplinary expertise across Europe and access to patient populations of rare diseases and complex conditions that require highly specialised treatments. Realisation of this potential requires highly organised coordination among the 24 ERNs, which operate in 26 countries, over 300 hospitals and more than 900 health care units, and also with other Europe-led research collaborations beyond the networks, with all the other actors in the field of rare diseases research, especially the European Joint Programme on Rare Diseases. Support for coordination of the research aspects of ERNs is currently limited.

**Scope:** This activity will aim at enhancing research and innovation capacity of the ERNs in view of achieving the goals of the International Rare Diseases Research Consortium (IRDiRC) for bringing new diagnostic tools and therapies more efficiently to the patients and for developing methodologies to assess the impact of diagnoses and therapies on rare disease patients, taking into account sex and gender differences where relevant. Support will be given to identify research priorities and potential synergies among ERNs and coordinate research and innovation activities to be tackled by ERNs. The project should address fostering collaboration in the field of clinical research among ERNs, ERN-independent clinical research collaborations and other stakeholders, such as research infrastructures, industry and patient organisations, as well as international collaboration with other clinical research networks. Close collaboration with the European Joint Programme on Rare Diseases will be necessary to ensure complementarity, to achieve relevant synergies and avoid overlaps. To
ensure broad geographical representation and participation across ERNs the proposals shall involve participants from several countries and aim at engaging all approved ERNs and other relevant research networks in Europe.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1.5 and 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:

- Along the IRDiRC vision to enable all people living with a rare disease to receive an accurate diagnosis, care, and available therapy within one year of coming to medical attention by 2027.
- Contribute to the development of a comprehensive European ecosystem for rare diseases and conditions that require highly specialised treatments, which brings efficiently results of research and innovation to the benefit of the patients.
- Enhance synergy with the Connecting Europe Facility Programme and the EU Health Programme which provides support for the functioning of the ERNs and the development of patient registries for ERNs.

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.

SC1-BHC-29-2020: Innovative actions for improving urban health and wellbeing - addressing environment, climate and socioeconomic factors

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Specific Challenge: The natural and built environment as well as the social fabric are critical determinants of health and well-being. Three quarters of the European population now live in cities and urbanisation continues at high speed, driven by economic growth and employment opportunities. The related environmental changes e.g. pollution of air and water, transportation problems, reduced social cohesion and stress affect physical as well as mental health. Although health has improved in the EU over the last decades, large differences in health still exist between and within all countries in the EU. These differences are caused by many factors such as living conditions, health-related behaviour, education, occupation and income, health care. Some of these inequalities are widening. As European cities are growing, they are increasingly taking action and introducing policies to become more sustainable and liveable, adapting to climate change, investing in a range of smart and innovative solutions such as clean and sustainable transport, higher energy efficiency and
stronger social cohesion. Similar initiatives are underway e.g. in Canada, USA as well as in Asia and Africa which could provide valuable knowledge.

At EU level, the Urban Agenda for the EU focuses on improving the life of their citizens for example through the development of digital solutions, reducing urban poverty and better integration of migrants and refugees. The headline targets in the EU2020 strategy aim to turn the EU into a smart, sustainable and inclusive economy delivering high levels of employment, productivity and social cohesion.

Improving urban health and reducing health disparities can be achieved by changes in individual behaviour as well as policies such as urban design and sustainable transport, (re)creating green and blue space or improved housing standards. There is a need to address public policies across sectors to achieve health benefits, systematically taking into account the health implications of decisions, to seek synergies, and avoid harmful health impacts (health in all policies).

Scope: European research should engage to build the evidence base of effective policies, developing and testing new initiatives to improve urban health and environment in Europe. Given the variety of national experiences across European countries and regions, there is an important potential to learn from each other’s practices and develop innovative actions for urban health.

Proposals should develop and test effective actions and/or policies for improved urban health and wellbeing in Europe. Where applicable, health inequalities and environmental aspects should be addressed. These actions or policies should also be assessed for cost-effectiveness as well as barriers and facilitators to implementation. Proposals should address improved physical or mental health, or both, while considering the relevant socio-economic and/or environmental determinants of health. They could address any sector (with priority on other sectors than health care) or policy area relevant to achieve a lasting health improvement. Proposals should include analysis of vulnerable groups and gender aspects and address any such inequities in the design of interventions. Research teams should bring in all appropriate scientific disciplines to design and test interventions. This includes social scientists not least for their role on behavioural aspects.

In order to link research to practical needs and user demands, teams should include other relevant parties in urban health, building partnership with stakeholders such as policy makers, users, business, and local communities. Proposals should address the need for more systematic data collection on urban health across the EU, to allow better analysis and conclusions. This may include the linking up with relevant population based cohorts. As urban health is of concern in many regions of the world, proposals should foresee the possibility to link up internationally with other relevant urban health initiatives. Proposals should include in their budgets funds for participation in at least one international meeting gathering urban health initiatives relevant to the research.

The Commission considers that a proposal requesting an EU contribution between EUR 4 and 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:

- More robust evidence for policy making on improved urban health in the EU
- Improved population health, physical and/or mental, in urban areas of the EU
- Reduced health inequalities in urban areas

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.*

**SC1-BHC-36-2020: Micro- and nano-plastics in our environment: Understanding exposures and impacts on human health**

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**Specific Challenge:** Global plastic production has increased exponentially over the past decades. A significant proportion of the plastic produced is not disposed of properly and persists in the environment, especially the marine environment. Plastic products can be slowly degraded into smaller pieces (micro- or even nanoplastics). Furthermore, microplastics are intentionally added to, for example, toothpaste and beauty products (referred to as microbeads) or are a secondary by-product of rubber from, e.g. textiles, tyre wear or artificial turf.

Plastic debris is associated with a “cocktail of contaminants” made up of chemical ingredients present originally in the plastic and chemical pollutants adsorbed to the plastic from the environment, including metals and other persistent contaminants such as polychlorinated biphenyls (PCBs) and flame retardants. The debris is filtered into marine species’ gastrointestinal tract mechanically or it may look like food to some species, thus entering the food chain, with unknown effects.

Risk assessments and reviews carried out in recent years have concluded that there is evidence that humans are exposed to micro- and nano-plastics through their diet, drinking water or inhalation. However, our understanding of the fate and toxicity of these plastic particles in humans constitutes a major knowledge gap, rendering it difficult to carry out proper science-based risk assessment and management.

**Scope:** Proposals should use innovative approaches to provide policy relevant scientific data in support of improved human health hazard and risk assessment of micro and/or nanoplastics.

The following research priorities on micro- and/or nano-plastics, *inter alia*, can be considered:

- Environmental/food/water sources for micro- and/or nano-plastics and transmission to humans;
- Methods for identification and quantification of micro and/or nano-plastics in foods, environmental media and tissues;
• Exposure levels of humans to micro- and/or nano-plastics and methods for human biomonitoring;
• Analytical methods for detection of micro- and/or nano-plastics particles and contaminants;
• Microbial colonisation of micro- and/or nano-plastics as vectors for potential pathogens;
• Micro- and/or nano-plastics as condensation nuclei and/or carriers for airborne particulate matter and chemicals harmful to health;
• Toxicology and uptake of micro- and/or nano-plastics and additives/adsorbed contaminants;
• Fate of micro- and/or nano-plastics in the gastro-intestinal or respiratory tracts and secondary organs;
• Effects and transport of micro- and/or nano-plastics across biological barriers, and bioaccumulation and cell uptake of micro- and/or nano-plastics, including studies at the cellular and molecular levels;
• Consideration of the effect of shape (as well as size) of micro- and/or nano-plastics, and comparison with the behaviour and effects of non-synthetic homologues, e.g. wool fibres;
• Immune responses;
• Preliminary investigations into long-term effects of micro- and/or nano-plastics. Sex and gender differences should be investigated, where relevant.

This topic is in support of the European Strategy for Plastics in a Circular Economy. Selected projects under this topic as well as projects selected under other topics in Horizon 2020 supporting the Plastics Strategy are strongly encouraged to participate in joint activities as appropriate. These joint activities could take the form of clustering of projects, participation in workshops etc. The proposals will also be expected to demonstrate support to common coordination and dissemination activities. Applicants should plan the necessary budget to cover those activities without the prerequisite to define concrete common actions at this stage. The details of these coordination activities will be defined during the grant preparation phase with the Commission.

The Commission considers that a proposal requesting an EU contribution between EUR 4 to 6 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Proposals could consider the involvement of the European Commission Joint Research Centre (JRC) to provide added value regarding a number of aspects, e.g. interfacing between the scientific and regulatory communities, advancing the regulatory assessment frameworks, coordination of the development of relevant guidance documents, guidelines and international harmonisation. In this respect the JRC is open to collaborate with any successful proposal.

Expected Impact:

• Better understanding of health impacts of exposure to micro- and/or nano-plastics, including preliminary investigations into long-term impacts.
- Innovation in human health hazard and risk assessment methodologies of micro- and/or nano-plastics.

**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.*

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**SC1-DTH-12-2020: Use of Real-World Data to advance research on the management of complex chronic conditions**

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**Specific Challenge:** The number of people with chronic illness is growing and almost half of them have multiple chronic conditions. Patients with complex chronic conditions (CCCs) have chronic multi-morbidities or chronic disease complications that require the attention of multiple health care providers or facilities as well as home-based care. A patient with CCC presents to the health care system with unique constellation of needs, disabilities, or functional limitations.

Managing patients with complex chronic conditions therefore needs approaches that ensure multi-disciplinary, personalised and well accepted by the patient ways of care and monitoring.

The controlled randomised clinical trials on chronic diseases provide important information that can be translated in the daily clinical practice, but they often do not comprise sufficient breadth and depth commensurate to the complexity of diseases, and to the degree of personalisation of treatment needed.

Real World Data (referring specifically to any type of data not collected in a randomised clinical trial) can complement these to fill the knowledge gap between controlled clinical trials results and clinical practice needs in real environments. They can provide new insights into disease patterns and help improve the safety and effectiveness of health interventions.

Tapping into this rich resource of ‘real world data’ issued from daily clinical practice, either collected on a permanent/regular basis by public bodies or through devices and mobile applications, and smartly assembled in combination with clinical studies, should boost both output and relevance of controlled clinical research results.

**Scope:** The topic will support clinical research integrating Real World Data from clinical practice or from patient’s daily life and linking them with data collected with a research purpose if relevant.

**The research focus will be on the use of real world data, either newly acquired or from existing sources (such as data from clinical professional societies/associations, cohorts,**
registries, biobanks or collected through genome research initiatives) to improve the clinical management of adults with complex chronic conditions. The use of new technologies for data analytics and interpretation such as artificial intelligence and computer modelling are encouraged.

The proposed intervention should allow better treatment or monitoring of the person and thus changes in disease progression and/or therapy response. Quality of life, patient safety, psychosocial aspects and well-being are important determinants of complex health conditions and should be addressed whenever relevant. The research should also assess the potential and use of RWD for different health authorities like regulators of safety and quality or health technology assessment bodies. Nevertheless, research has to take duly into account sex and gender differences.

The proposed intervention must add clinical value as well as societal benefits and show feasibility and sustainability in real-life settings. In order to ensure acceptability and sustainability of the intervention early involvement of patients and care providers in the design of the research is considered essential. Similarly, proposals should duly take into account the diversity of health systems in different regions of Europe.

Data protection, data privacy and ethical issues have to be carefully considered as personal data from different sources are to be linked in the course of the proposed research. Data sets assembled under the project, including the linkage to ‘real world data’ should be preserved in a sustainable and accessible way so as to enable future research on the targeted CCC, thus contributing to the overall imperative of Open Science.

Research that focuses on self-management only is not in the scope of this topic. Research on rare and/or infectious diseases are supported through other sections of the programme and are excluded from the scope of this topic.

The Commission considers that proposals requesting a contribution from the EU of between EUR 4 and 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:**

- Demonstrate the potential of the use multi-disciplinary multi-source Real World Data to advance clinical research on complex chronic conditions;
- Demonstrate potential and use of RWD, in particular RWD from disease-specific professional societies/associations, by health authorities to understand safety, quality and effectiveness of therapies;
- Improve the clinical outcomes as well as quality of life of patients living with CCCs;
- Advance the understanding of management of complex diseases including the interdependence of co-morbidities, thus underpinning evidence based therapies and prognostic approaches;
- Further development of new technological tools and platforms for advanced data management;
• Contribution to the cross-border health data exchange and to the goals of the Digital Single Market.

**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.*

**SC1-DTH-13-2020: Implementation research for scaling up and transfer of innovative solutions involving digital tools for people-centred care**

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<td>24 September 2019, 2nd stage Deadline 07 April 2020 17:00:00 Brussels time</td>
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**Specific Challenge:** People-centred care is one of the main goals of health systems. It relates to a stronger orientation towards the needs of people and their involvement in the treatment process and decision-making. This is expected to result in a better care as experienced by people, in less inequality, better health promotion, better disease prevention, and treatments better targeted to people’s needs. Health system transition to people-centred care requires empowering citizens and integration of services.

The growing digital transformation of health and care offers great opportunity to achieve this transition. Innovative solutions involving digital tools have the potential to improve people-centred care through self-management, goal orientation and shared decision-making. However, technical innovation is unlikely to achieve the anticipated improvements/impact if not accompanied by supportive organisational and policy innovations. Given the complexity and differences between health systems, cross-national comparative health services and systems research as well as implementation research are needed to better understand the contextual factors that impact the successful introduction, use and sustainability of innovative solutions. This will in turn facilitate their scalability and their transferability to other settings.

**Scope:** Proposals should study the scaling-up or transferability of an innovative solution involving digital tools, i.e. the conditions under which it can be implemented in other health systems and whether it can have the same intended effect.

To address this specific challenge, the proposals should:

• Identify an innovative solution involving digital tools (or a set of comparable innovations developed in parallel in different settings) with the potential to enhance people-centred care. The selected innovative solution should be described and supported by sufficient documented evidence on its effectiveness in specific contexts and if possible cost-effectiveness.
- Design and conduct an implementation study to collect either prospectively or retrospectively (depending on the maturity of the innovative solution) the evidence needed to inform the successful scaling up or transfer to different health systems with particular focus on the contextual factors including legal, ethical, behavioural and social issues.
- Identify the key aspects for scaling up or transfer, identify potential barriers, necessary measures/changes as well as facilitators to adopt the solution.
- Develop a prediction model to help decision-makers decide on the implementation of the solution as well as guidance to assess the future impact of the transferred solution on health system performance.

Proposals should be multidisciplinary, bringing together expertise in health services and systems research, human and social sciences and implementation research. The main focus should be on improving people-centeredness in Europe but solutions can originate from non-European countries. Gender aspects should be taken into account. Careful consideration should be given to vulnerable groups. Relevant stakeholders including end-users of research and patients’ organisations should be identified and involved throughout the project lifetime. Innovative approaches in gathering patients input should be considered.

The proposals should complement or build on existing initiatives, including (but not limited to) results of EU-funded projects. Selected proposals should provide evidence to support the third pillar of the Communication from the Commission on enabling the digital transformation of health and care in the Digital Single Market, "Digital tools for citizens empowerment and person-centred care".

The Commission considers that proposals requesting a contribution from the EU Horizon 2020 research programme of between EUR 3 and 4 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:**

- Availability of methods and strategies for the implementation of innovative, ethically and legally sustainable solutions aiming at improving people-centred care
- A better understanding of organisational and system changes, as well as social and behavioural changes required to successfully embed evidence-based innovative solutions involving digital tools into daily practice and ensure their sustainability
- Increased scaling up and transfer of innovative solutions improving people-centred care in Europe
- In the medium and long-term, health services more responsive to the needs of people and their carers (formal and informal), more effective, efficient and equitable health 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.*
SC1-HCC-10-2020: Towards a Health research and innovation Cloud: Capitalising on data sharing initiatives in health research

SwafS Key Word(s) | Ethics, Gender Equality, Open Access/Open Data, Responsible Research and Innovation (RRI)
---|---
Deadline | 07 April 2020 17:00:00 Brussels time

**Specific Challenge:** Technological innovation has triggered an unprecedented increase in data production in health research and healthcare. The need to make EU health research data FAIR (i.e., Findable, Accessible, Interoperable and Re-usable) becomes more pressing than ever before if European health research is to reap the full benefits of this valuable resource. The stakes are high because making optimal use of this health data is expected to both accelerate research discoveries and bring them closer to clinical application for the benefit of EU citizens.

A wide range of challenges needs to be overcome before this vision becomes a reality. To be able to seamlessly integrate and analyse health data coming from different sources and different health sub-disciplines, individual research institutes and/or hospitals would need a potent IT infrastructure and interoperability solutions as well as powerful data analytics tools. Services in the Internet Cloud (i.e., Cloud Services) are a promising starting point to build these systems.

Properly addressing the security and privacy of health research data, and the compliance with various levels of legislations, in particular the General Data Protection Regulation (GDPR) together with the applicable National legislations in the EU Member States/Associated Countries and with different jurisdictions is a critical step for the design of a Health Research and Innovation Cloud (HRIC). These aspects need to be an integral part of the proposal so that the collection, governance, sharing, analysis and curation of health research data across different application domains can be achieved in ways that are technologically robust, scientifically reliable, and ethically and legally sound.

**Scope:** The successful project should bring together data-intensive EU health research initiatives to design an implementation roadmap /strategic agenda for a one-stop shop, a HRIC FAIR data portal respecting legal and ethics requirements. It should also define and promote, among research projects, procedures to make data FAIR as well as a standard way of communicating such data, so that any IT-system can easily provide metadata to the portal. This portal would serve as catalogue of all relevant publicly-funded health research databases, registries and infrastructures (e.g., ESFRI) and allow access to high quality health research data. The proposal is expected to build a community (i.e., a wider forum) in order to align strategies and capitalise on the work done by relevant European and international initiatives. The proposal should develop two use cases, where all the aforementioned aspects will be integrated and analysed. These use cases should link health research data, and if relevant, health research data with curated clinical data and health administrative data. The participation of experts in ethics and law as well as patient representatives is strongly recommended.
The proposal should also produce guidelines for researchers to contribute to the proper application of the GDPR regulation, taking into account the specific features of processing personal data in the area of health. The HRIC should contribute to the European Open Science Cloud.

Project results should be widely disseminated to the relevant stakeholders across the Member States and Associated Countries.

The implementation roadmap of the HRIC FAIR data portal will define how to address the specific requirements of health research data. In this sense, the selected proposal is expected to collaborate with the projects funded under topics 'INFRAEOSC-04-2018' and 'INFRAEOSC-06-2019-2020: Enhancing the EOSC portal and connecting thematic clouds', in particular with those in the health field. Grants awarded under these topics will be complementary. The respective options of Article 2, Article 31.6 and Article 41.4 of the Model Grant Agreement will be applied.

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

Expected Impact:

- A HRIC FAIR data portal respecting legal and ethics requirements. This portal should serve as catalogue of all relevant publicly-funded health research databases, registries and infrastructures (e.g., ESFRI) and allow access to high quality health research data.
- Through use cases, demonstrate the added value of close collaboration of health researchers with healthcare providers and other actors in health care systems.
- Guidelines on application of the GDPR and the EU Member States and Associated Countries national legislations. The developed guidelines should cover the processing and further processing of health research data.
- Contribute to the setup of a Health Research and Innovation Cloud, the Health thematic cloud of the European Open Science Cloud.
- Contribute to the Digital Single Market through piloting IT health research solutions.

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.
## Call – Digital transformation in Health and Care

### SC1-DTH-02-2020: Personalised early risk prediction, prevention and intervention based on Artificial Intelligence and Big Data technologies

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**Specific Challenge:** The ageing of the population together with the rising burden of chronic conditions (incl. mental diseases) and multi-morbidity bring an ever increasing demand to strengthen disease prevention and integrate service delivery around people's needs for health and social care.

It is widely recognised that health systems must put more emphasis on prevention and adopt a person-centred rather than a disease-centred approach. The goal must be to overcome service fragmentation and to move towards integration and coordination of interventions along the continuum of care.

Personalised early risk prediction models, estimating the probability that a specific event occurs in a given individual over a predefined time, can enable earlier and better intervention, prevent negative consequences on a person’s quality of life and thus result in improved individual health outcomes.

The challenge is to develop and validate these comprehensive models based on AI or other state of the art technologies for prediction, prevention and intervention using multiple available data resources and to integrate them in personalised health and care pathways that empower individuals to actively contribute to risk mitigation, prevention and targeted intervention.

**Scope:** Proposals should build on results of projects and the state of the art in ICT for early risk prediction and introduce innovative ICT solutions through data, data analytics, advanced or novel digital technologies, services, products, organisational changes, and citizens data ownership, that lead to more effective health and care systems. These innovative ICT based solutions may address one or multiple conditions and explore ways of inducing adequate personalised preventive measures (e.g. behavioural change, diet, interventions, medication, primary prevention) from advanced predictive models. Sustainable behaviour change refers to efforts to change people’s personal habits to prevent disease, stimulate healthy people to monitor their health parameters and thus lowering the risk of developing (chronic) conditions.

Proposals should build on the use of already existing and/or new data generated by individuals, health professionals and other service providers (including but not limited to data collected through IoT enabled devices, wearables, mobile devices, data source networks or data lakes etc. collected outside the controlled environment of clinical trials) by citizens, healthcare professionals, public authorities and industry, with a view to developing personalised early risk prediction, prevention and intervention approaches that meet the needs of individuals while providing them with adequate information to support informed decisions.
decision making, improve the uptake of preventive approaches and lead to better health outcomes.

Proposals should also include actions aimed at increasing health literacy, including the role of the citizen as owner of his or her own personal data, as well as advancing health and care professionals’ proficiency in novel, data-oriented health services through the use of digital solutions to increase knowledge about diseases and help them in the interpretation of symptoms and effects (e.g. with visualisations like dashboards, etc.), notably of early warning signs and medical information. Early warning signs relay to either healthy people monitoring several body parameters e.g. to conduct healthy life styles and increase physical activity levels or to the detection of the deterioration of the condition of already diseased patients. The latter could include advanced prediction models from aggregated patient data of certain health events/complications.

Proposals are expected to be built on realistic scenarios for new health and care pathways, and should integrate multi-disciplinary research involving behavioural, sociological, medical and other relevant disciplines. Stakeholder engagement (esp. considering vulnerable user groups, i.e. persons belonging, or perceived to belong, to groups that are in a disadvantaged position or marginalised, for example, elderly people, persons with special needs or chronic diseases) should be part of the research design for an agile approach to ensuring that relevant user needs (including social, age and gender aspects) are met and solutions find acceptance by users. Full account should be taken of ethical and legal aspects e.g. data protection, privacy and data security. This action should create a clear and coherent set of recommendations or guidelines for public health authorities in Europe together with a strategy to support their implementation.

No large-scale piloting or clinical trials are expected in this Research and Innovation Action. However, proposals should include validation (testing on a prototype and/or proof of concept) and demonstration of feasibility of their respective models, technologies and scenarios.

The Commission considers that proposals requesting a contribution from the EU of between EUR 4 and 6 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Participation of SMEs is encouraged.

**Expected Impact:** The proposal should provide appropriate indicators to measure its progress and specific impact in the following areas:

- Evidence of the benefits of delivering adequate information regarding personalised risk prediction, prevention and intervention, based on proof of concept and involvement and specified roles of relevant stakeholders.
- Clear improvements of outcomes for individuals, care systems and wider society from prevention measures and interventions based on personalised early risk prediction in comparison with current practices.
- Usefulness and effectiveness of integration and coordination of interventions in new health and care pathways based on person-centred early risk prediction, prevention and intervention models.
- Realise large-scale collection of user-generated data in compliance with data protection, privacy and security rules and principles.
- Support integration with tools and services under the European Open Science Cloud.

**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.*

**SC1-DTH-04-2020:** International cooperation in smart living environments for ageing people

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**Specific Challenge:** Demographic change and the ageing of the population create new heterogeneous challenges for society and, in particular, for ageing people. On top of the health-related age impairments such as poor health, cognitive impairment and frailty, ageing people are at risk of facing situations leading to potential social exclusion with considerable negative consequences for their independence, quality of life, those who care for them, and for the sustainability of health and care systems. Digital solutions can play a key role when addressing these challenges and, especially those aimed at creating smart living environments for ageing people. For these to be successful, one necessary condition is to ensure users’ acceptance, which in turn requires bringing the users to the centre of the design. Moreover, these environments need to provide innovative user-friendly user interfaces such as voice-based interaction. These challenges are shared by ageing populations beyond the EU and other countries are also looking into the potential of digital solutions to address them. In this context, there is a need to explore collaboration and cooperation with international efforts in this domain. This action aims to address these challenges by developing smart living environments for ageing people, while strengthening relevant international collaboration in the area.

**Scope:** Proposals should develop and validate new solutions leading to smart living environments for ageing people, supporting independent active and healthy lifestyles. The proposed solutions should provide personalised advice, guidance and follow-up for key age and health related issues in daily life which impact the person's ability to remain active, healthy and independent. These may include amongst others diet, physical activity, risk avoidance, preventive measures, lifestyle and activity management, leisure, social participation and overall wellness and health. Proposals should pay particular focus to measures aimed at fostering social participation and avoiding social exclusion.

Proposal should convincingly describe the planned progress beyond state of the art in the development and integration of trusted smart living environments for ageing people, which should build upon intelligent and interoperable information and communication technology (ICT) environments, access to relevant physiological and behavioural data, emotional computing, open platform and Internet of Things approaches.
Proposals should be based on trans-disciplinary research, involving behavioural, sociological, psychological, medical and other relevant disciplines, including gender and cultural aspects. Proposed solutions should make use and further develop user interaction, including voice-based, taking into account Artificial Intelligence methods for understanding the users' intentions, knowledge extraction and learning. It is essential that they build on active user engagement in order to ensure the understanding of user needs. They need to safeguard ethics, privacy, security and regulatory aspects and take gender issues into account appropriately. The proposed solutions should be unobtrusive and avoid attention theft. Proposals should include validation in realistic test sites, such as at home or at care centres, in order to demonstrate the expected benefits and impacts.

The proposed research and innovation actions should address one of the following international collaboration possibilities:

1. **Cooperation with Japan**

Proposals addressing international collaboration with Japan should ensure the use of generalized infrastructures such as cloud system and open sources. Without limiting the use of specific applications or hardware systems, platform approaches are required to ensure interoperability and future expandability. Proposals are recommended to foster the adoption of the existing standards (including de-facto/ consortium standards), contributions to appropriate ongoing standardization work, and suggestions of new standards by an EU-Japan joint consortium in order to accelerate practical introduction of the results into societies. Proposals should be driven by the needs, interests and lifestyles of older people in order to ensure user acceptance, taking into consideration the relevant cultural aspects. Proposals are expected to contribute to help ageing people remain active and healthy inside and outside their home, by providing action guidance and decision support derived from personal information such as memories and action histories through progress beyond the state of the art in interaction technology and ICT. The proposed solutions on an open-platform where data collection by sensors, data analysis by artificial intelligence and user-friendly user interfaces cooperatively work are expected to be naturally integrated into ageing people’s daily life and provide emotional support to ageing people. Proposed solutions should make use and further develop multimodal interaction including voice-based conversation and gesture in order to help ageing people by the most effective and personalized way.

An amount of EUR 4 million will be reserved for proposals focusing on cooperation with Japan.

2. **Collaboration with Canada**

In addition to the scope and challenge of this topic as defined above, proposals addressing the international collaboration with Canada need to include the use of ICT-based solutions to support smart living environments that address transitions in care challenges for ageing people. Applications should focus on the development, integration and evaluation of eHealth innovations, in collaboration with stakeholders, including eHealth industry partners,
clinicians, patient/family/caregivers and decision makers, in order to improve health outcomes.

In collaboration with stakeholders, applicants should consider ways to improve the quality of outcomes and the cost-effectiveness of smart living environments that support care transitions. This call supports the integration of smart living environment solutions which are ready to progress beyond the prototype stage for use into care delivery programs and undergo pragmatic evaluation. Applicants are required to use strong research designs; and should provide a clear description and justification of the proposed research methodology to be used.

Funding of the Canadian component of the proposal requires that a proposal also includes one or both of the following research areas as relevant to aging people.

Areas:

1) Changing health status or care: Individuals facing changes in their health status or living with chronic or complex health conditions. These individuals experience several handovers among health providers, institutions, hospital units and/or have a change in their care location (e.g., home vs. hospital; community care vs. tertiary care).

2) Key populations to optimize transition in care outcomes: Populations at increased risk of adverse transition in care outcomes include but not limited to: First Nations, Inuit and Métis Peoples; individuals residing in rural and/or remote communities; **individuals who are transgender; individuals with an intersex condition**; older adults and new aging populations (i.e., survivors of diseases/conditions that previously led to early death); new immigrants; and those who experience systemic, cultural and/or language barriers.

The consortium should also have the capacity to:

- Establish productive partnerships with eHealth innovation industries to co-design eHealth-enabled smart living environments to improve transitions in care;
- Evaluate the impact, efficiency, and cost-effectiveness of eHealth innovations in addressing gaps and inefficiencies using smart living environments in servicing the identified research areas. The evaluation will utilize rigorous research design(s) to generate high-quality (valid and reliable) evidence that will assist in the subsequent spread and scale (sharing) of successful innovations; and
- Integrate successful eHealth innovations into care delivery programs and promote their uptake and use to support effective and efficient smart living environments.

Example of potential topics may include, but are not limited to the following:

- Ageing patients/survivors patients with acute, chronic or complex health conditions that are transitioning from hospital to home and supported by Information and Communication technology (ICT)-based solution (i.e. sensors monitoring their vitals and providing feedback to themselves and providers).
- Ageing patients/survivors of chronic conditions transitioning into a smart living long-term care facility.
- Implementing smart living environments for managing care transitions of ageing people within different culture and social groups, and/or geographic regions.
• Evaluation of smart living environment solutions that address transition in care challenges for ageing patients with the capability to progress beyond prototype stage, into care delivery programs for pragmatic evaluation. In alignment with the CIHR Sex, Gender and Health Research policy, all proposals requesting funding from the CIHR are expected to consider how sex and/or gender might shape eHealth innovations to support transitions in care for ageing populations.

An amount of EUR 4 million will be reserved for proposals focusing on cooperation with Canada.

At least one proposal collaborating with Japan and at least one proposal collaborating with Canada should be funded under this action. The evaluation of proposals will be jointly carried out by the Commission and the relevant Japanese and Canadian funding organisations as applicable.

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 and 4 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Participation of SMEs is encouraged.

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 one organisation as partner in the consortium from Japan or Canada.

Expected Impact: The proposal should provide appropriate indicators to measure its progress and specific impact in the following areas:

• Independent living, and quality of life of older persons compared to current state of the art;
• Usefulness and effectiveness of personalized recommendations and follow-up in terms of the goals of preserving physical, cognitive, mental and social well-being for as long as possible;
• Evidence of user-centred design and innovation, effective ways of human computer interaction, and user acceptance;
• Fostering social participation and reducing social exclusion’s risks;
• Validation of non-obtrusive technology for physical, cognitive, social and mental well-being;
• Strengthened international cooperation in Research and Innovation on ICT for AHA.

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.
**SC1-DTH-06-2020: Accelerating the uptake of computer simulations for testing medicines and medical devices**

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**Specific Challenge:** The development of medical devices and pharmaceutical products are associated with high costs. A new pharmaceutical product and its introduction into the market is estimated to cost today over 2 billion EUR, from which nearly 75% is spent at the late stages of the drug development process in the various phases of the clinical trials. As biomedical knowledge increases and bioinformatics capability likewise grows, there is hope that greater predictive power may be obtained from individualised computer simulations used in in-silico medicine research, such as predictive toxicology and pharmacokinetics.

The adoption of individualised computer models and simulations to develop and assess drugs and devices, their translation into the clinic and penetration on the market of ICT solutions, depend on the trust of users (healthcare professionals and patients), the industry and investors and the competent authorities and regulatory bodies. The users need proofs of validation in the real clinical contexts.

The specific challenge of this call is accelerating the uptake of individualised computer simulations in the regulatory evaluation of medicines and/or medical devices to become closer to the market. Applicants will provide proofs of validation of computer modelling solutions that gain the trust of regulatory bodies for innovation, in order to, in collaboration with academic and industrial experts, develop the framework of standards, protocols and shared resources required to evaluate the safety and the efficacy of medical devices and/or medicines at the end of the drug development process.

**Scope:** Proposals will develop innovative scientific and technological computer modelling solutions for testing medicines and/or medical devices. The proposed computer modelling solutions will be the result of a multidisciplinary effort (e.g. within the fields of computational modelling, chemo/bio-informatics, systems biology, pharmacology, -omics (genomics, epigenomics, metabolomics), tissue mechanics, biology, pharmaceutics, medicine, physiology, toxicology, *social science aspects such as gender*) and should also explore and inform of the reasons for failure should the drug or medical device be found not efficient or safe and will suggest improvements. To help adopt such in-silico methods, measures for validation (human trials, animal studies, in vivo and in vitro validation, including the use of biobanks if appropriate) of the in-silico results should be included in the proposed projects. The benefit for human health, environment and animal welfare should be analysed and quantified. Engagement with regulators and consideration of the regulatory framework issues for computer simulations are highly recommended. Participation of SMEs is encouraged.

The Commission considers that proposals requesting a contribution from the EU of between EUR 6 and 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 proposal should provide appropriate indicators to measure its progress and specific impact in the following areas by contributing to:

- Accelerating the adoption of computer simulations for testing medicines and/or medical devices, their translation into the clinic and the market.
- Increasing the trust of users (healthcare professionals and patients), investors and stakeholders at industry and academia to adopt computer simulations for testing medicines or medical devices as a substitution or complement of current clinical trials when appropriate.
- Contributing to redesigning current drug clinical trials by integrating in-silico methods for testing medicines or medical devices and creating a unique, digitised, personalised testing environment.
- Engagement with regulators and consideration of the regulatory framework for computer modelling solutions.
- Contributing to reducing the size and the duration of the human clinical trials and/or contributing to significantly reducing animal testing in clinical trials.
- Contributing to increased efficacy and patient safety in clinical trials.
- Contributing to reducing development costs and/or shorter time-to-market for new drugs or new medical devices.
- Contributing to setting standards for computer modelling solutions for testing.
- Contributing to the European Cloud Initiative, notably by providing open, reusable data and in silico models for clinical trials.

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.

SC1-DTH-14-2020: Pre-commercial Procurement for Digital Health and Care Solutions

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Specific Challenge: Digital solutions supporting a continuum of care across a range of health and care services can relieve the pressure on governments to provide more cost-effective health and care systems by improving the use of healthcare and health outcomes. In this context the challenges are to network, lead and facilitate health systems research, innovation and digitisation in view of addressing key areas of interventions in health and care services including health promotion and disease prevention.

Scope: Support the health and care service provider to procure the development of digital services that can facilitate the transition to integrated care models across health and social services and country-specific cross-institutional set-ups, including decentralised procurement environments and collaboration across institutions. Key challenges that could be addressed are patient empowerment, self-management, patient safety, patient
involvement, chronic disease management, diagnosing, hospital logistics, skills and independent living. These challenges could be addressed by ICT-based solutions such as, e-Health, telemedicine, and mHealth, to be defined through the market consultation process. This should result in early adoption and demonstration of the potential for scaling-up the services and positive impact with evidence of appropriate incentives of various actors. Legal, ethical, gender and socio-economic issues should be addressed as appropriate. Proposals should deliver and:

- be driven by clearly identified user needs guiding the procurers of the buyers group;
- be driven by public and/or private procurers from each country participating (at national, regional or local level) that have responsibilities and budget control in the relevant area of supply of health and care services;
- demonstrate strong commitment of end-users and their communities in the co-creation process;
- as applicable contribute to the use of interoperable solutions based on open platforms and take into account existing best practices and standardisation initiatives;
- validate the benefits (both clinical and financial) of ICT-based services in comparison to traditional healthcare services;
- provide robust safeguards to ensure compliance with ethical standards, patients’ rights and privacy protection;
- include clear time-lines, a well-structured work-plan aligned to the objectives of the different phases and according particular importance to the role played by the preparatory phase; (templates made available by the Commission are strongly recommended to be used in particular as concerns the call for tender) and;
- address training aspects, digital health literacy and new collaborative innovation principles and practises, management, and retention of healthcare staff under this topic.
- build on expertise from and align with other relevant actions such as PIPPI and EURIPHI.

The procurers, hospital clusters, care services providers and other parts of the regional ecosystems should share knowledge, test results and needs to better coordinate the primary and community care, and stimulate local responsibility for care services, monitoring and rehabilitation. This may include aspects such as organisational processes, digital health literacy, workforce training, e-health workforce, financing and business models, hospital and telemedicine services, home care, patient centeredness, development of shared open source IT-based platforms, data integration, standards (supporting interoperability) and regulatory issues, management and retention of healthcare staff.

The service innovation should facilitate the early adoption and transferability (to other local contexts) of successful solutions addressing the innovation gap. Multi-policy/strategy collaboration across institutions (hospitals and institutions under the responsibility of municipalities or regions), industries, academia and user communities capable of establishing dedicated operational programmes are necessary to safeguard both the service and business performance metrics and the growth potential in the innovation chain.

The proposals should include the methodology foreseen to measure progress and validation process applicable in the tendering phase, towards the key performance areas of quality of care, sustainability and economic value within the selected key area of intervention, see e.g.
MAFEIP. Sufficient travel allowances for regular information days concerning the procedures and thematic networking events (e.g. related to relevant co-ordination and support actions including SC1-HCC-04-2018) should be foreseen. A plan to implement the services should be included. In that context investigation of complementary procurement approaches including value based procurement are encouraged.

The Commission considers that proposals requesting a contribution from the EU of between EUR 4 and 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Proposals for this topic should follow the specific requirements for pre-commercial procurement (PCP) supported by Horizon 2020 grants as set out in Annex E of the WP.

Expected Impact: The proposal should provide appropriate indicators to measure its progress and specific impact in the following areas:

- Established path to innovation, evidence of benefits of disruptive technologies that can support the development of sustainable business models, improved user and market engagement, strengthened procurement community, evidence of healthy innovation ecosystem including researchers, users, eHealth and other solution providers and procurers. Evidence in key performance areas i.e., quality in health and care, sustainability of the delivery system and economic value.
- Increased opportunities for solution uptake across wider international procurement markets by aiming at interoperable solutions that are validated through field testing by participating procurers in multiple countries across Europe and contribution to standardisation where relevant.

Type of Action: Pre-Commercial Procurement

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

**SC1-HCC-06-2020:** Coordination and Support to better data and secure cross-border digital infrastructures building on European capacities for genomics and personalised medicine

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Specific Challenge: Personalised medicine uses data generated by new technologies to better understand the individual characteristics in order to deliver the right care to the right person at the right time. This approach has substantial potential for tackling major health challenges, such as cancer and rare diseases, helping to deliver better and more effective health outcomes. In order to seize this potential, there is a need to support the large scale pooling of expertise and of genomic and other health data, as well as to identify common standards for the generation, analysis and sharing of this data. Coordination and support is needed to develop cross-border solutions for sharing expertise and linking genomic and other health data. This should be achieved by identifying relevant
initiatives and projects, discerning best practice emerging from clinical implementation and engaging with relevant stakeholders. It is critical to identify common standards for data quality, security, interoperability, privacy, ethical guidelines and governance models underpinning the establishment of sustainable cross-border digital infrastructures and networks for genomics and personalised medicine in Europe.

**Scope:** This action should aim to support the identification of common standards, cross-border digital infrastructures and coordination mechanisms to advance personalised medicine in Europe. It should build on existing initiatives, projects and resources at national, regional and European level. This CSA should consolidate knowledge from existing initiatives and projects to identify the most appropriate practices, standards and governance models for establishing cross-border digital infrastructures supporting genomics research and personalised medicine in Europe.

In a coordinated effort with national initiatives, Research & Innovation projects, and other stakeholders (among them national authorities, health institutions, standardisation bodies, ICT industry), the action should develop coordination mechanisms for sharing expertise and for securely linking genomic and other health data (e.g., electronic health records, registries, including rare disease registries etc), respecting legal (including but not limited to similarities and differences in EU Member states and associated countries, standardisation, type approval etc.) and ethical requirements. This CSA should identify and facilitate the exchange of best practices between relevant R&I projects, initiatives and other stakeholders. It should provide an overview of relevant standards for data quality, security, interoperability, privacy and ethics. It should identify critical elements of a system of transparent governance of a digital infrastructure enabling the cross-border linking of genomic and other health data in Europe. It should also develop a quality risk management concept for sustainability and further development.

For grants awarded under this topic, beneficiaries may provide support to third parties as described in General Annex K of the Work Programme either in form of grants or prizes. The respective options of Article 15 of the Model Grant Agreement will be applied. The Commission considers that proposals requesting from the EU up to EUR 4 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 proposal should provide appropriate indicators to measure its progress and specific impact in the following areas:

- Agreed standards and mechanisms for the cross-border linking and analysis of genomic and other health data with potential for widespread adoption across Europe.
- Adequate basis for developing a cross-border digital infrastructure for linking genomic and other health data in Europe.
- Best possible and secure use of genomic and other health data for personalized medicine.
- Adequate basis for investment decisions in personalized medicine (both private and public) based on expected returns.
- Support Europe’s global leadership in personalized medicine.
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.*

**SC1-HCC-07-2020: Support for European eHealth Interoperability roadmap for deployment**

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**Specific Challenge:** Large amounts of valuable health data are generated and recorded concerning EU citizens. This includes clinical and medical data that are collected at times of treatments or data generated by the citizens themselves on health and care, fitness and wellbeing. Opportunities to use these data for better health, to make contributions to personalised or precision medicine, better prevention approaches and innovative services are often missed because data do not become available and are not interoperable and portable to the extent necessary. Interoperability of digital platforms and solutions, making data accessible in an actionable form for exchange and portability is required to pave the way for better health outcomes and treatments. Efforts have been and are still invested in standardisation and harmonisation (including common clinical models, tools and agreed approaches), privacy and security (including data access and data integrity) and communication (towards citizens, patients and healthcare providers) to allow citizen/patient empowerment, advance health research and medical science, improve health for everyone and also define requirements for an appropriate data quality.

**Scope:** Considering and building on outcomes of related activities and projects, the focus is to support deployment and monitoring of eHealth interoperability meaning real life interoperable digital platforms and solutions for use by citizens, researchers, health services and the workforce across borders in the EU Digital Single Market. The support should comprise a coherent package of activities that will improve the deployment of interoperable eHealth solutions and platforms, with a significant number of citizens in several Member States accessing and providing their own health data in platforms. The deployment should consider interoperability of (electronic) Health Records across national borders, the empowered European citizen, compliance with the General Data Protection Regulation, the Network and Information Systems Directive and the operation in a European digital single market. The deployment should build on the Commission Recommendation on the European EHR exchange format and be guided by strong and systemic contributions for better data and better computational approaches to advance disease prevention and personalised medicine. Emphasis should be given to specific fields of high societal relevance and high prevalence. Omics type of information associated to the use and exchange of health datasets should be strongly considered with special regard to analysis and corresponding further health-related data. Relevant activities of the eHealth Network should be taken into account. For all relevant data (e.g. from hospitals, doctors or user-generated) ethics and legal issues should be considered appropriately.
For grants awarded under this topic, beneficiaries may provide support to third parties as described in General Annex K of the Work Programme either in form of grants or prizes. The respective options of Article 15 of the Model Grant Agreement will be applied.

The Commission considers that 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 proposal should provide appropriate indicators to measure its progress and specific impact in the following areas:

- Citizen-centred secure electronic health data use across Europe for citizens managing own health data;
- Support cross-border and inter-institutional interoperability solutions;
- Specific contributions made for improved health conditions, healthy working conditions and quality of life;
- Improved efficiency in terms of health economics and occupational health such as on timeliness of intervention or prevention approaches;
- Extended EU citizens’ management of own healthy life continuum across borders, actors and confinements;
- Improved level of accessibility, control and portability of health data for citizens;
- Open, extensible and harmonisation-based citizen health records solution for service and app developers;
- Easy and safe for citizens to provide and donate their health data for research;
- Contributions to requirements, specifications and guidelines for the exchange of images, image reports, laboratory results and discharge letters at national and cross-border level;
- Support integration with tools and services under the Digital Service Infrastructure supported by the Connecting Europe Facility.

**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.*

**SC1-HCC-09-2020: Supporting deployment of eHealth in low and lower middle income countries in Africa for better health outcomes**

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**Specific Challenge:** E-Health can contribute to better, more accessible and more efficient health and care services, in particular to remote populations and underserved communities. E-Health and mHealth technologies can only be successful, if they are supported by national governments, who have established e-Health policies and strategies and demonstrate strong
SwafS Opportunities

ownership of the national e-Health programme. E-Health programmes will only achieve their objectives, if they are adapted to country needs, are citizen-centered and sustainable through sound public finance management. These pre-requisites will impact on the quality and accessibility of such e-Health services and their sustainability, usability, data security and interoperability, privacy and ethics issues.

Access to one's own health data and high-quality mHealth services in real-life environment are still a challenge because of a lack of government ownership, e-Health policies including enabling regulations, a sustainable and trustable infrastructure, and digital literacy. Coordination and support is needed for taking stock of and further developing strategic partnerships on E-Health deployment together with low and middle income countries and regions in Africa with the aim to improve the health of the citizens.

Scope: The aim is to support the coordination of a registry of relevant existing e-Health solutions describing their services and potential for low and lower middle income African countries or regions together with a roadmap and strategic implementation plans building on the requirements of end-user communities and policy makers in the target countries. The action should take into account national and regional policies and (best) practices regarding health and care services and health infrastructures and also include lessons learned from existing eHealth policies and programmes at all levels of the health system. It should take into account the new Africa-Europa Alliance for Sustainable investment and Jobs as relevant. It should identify and build on and identify relevant existing and emerging initiatives and capacities in Europe and Africa which can form the basis for future cooperation and deployment.

The action should make use of and contribute to standardisation as appropriate. Proposals should comply with and contribute to the development of the relevant legislation, in particular on ethics and data protection of health data. Socio-economic and gender issues should be addressed appropriately.

The action should also ensure that relevant stakeholders including end-users are engaged during the process through national, regional and international workshops and a set of communication and dissemination actions, aligned to national policies, to support the deployment of e-Health services in low and lower middle income countries in Africa. The action should provide an added value, to the facilitation of the cooperation between European and low and middle income countries in Africa for a better health for all.

For grants awarded under this topic, beneficiaries may provide support to third parties as described in General Annex K of the Work Programme either in form of grants or prizes. The respective options of Article 15 of the Model Grant Agreement will be applied.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1.5 and 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. At least one consortium partner must come from low and lower middle income countries in Africa.

Expected Impact: The proposal should provide appropriate indicators to measure its progress and specific impact in the following areas:

- Higher level of international cooperation and networking in eHealth programmes and policies between European countries or regions and low and middle income African
countries, focusing on areas that are beneficial to the target countries / regions and their citizens in eHealth;
- Increased opportunities for e-health innovators, patients, medical staff and health system stakeholders in Europe and Africa;
- Better accessibility of eHealth Services.

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.*

**Call – Trusted digital solutions and Cybersecurity in Health and Care**

**DT-TDS-04-2020: AI for Genomics and Personalised Medicine**

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**Specific Challenge:** Several national and regional initiatives already support the pooling of genomic and other health data to advance research and personalised medicine. The next step is to make use of the existing infrastructures and initiatives for the successful exploitation of genomic data to facilitate personalised medicine.

The challenge is to demonstrate the potential and benefits of AI technologies for identifying new knowledge, support clinical research and decision-making by linking Europe’s relevant genomic repositories, while ensuring full compliance with data protection legislation and ethical principles.

**Scope:** Proposals should demonstrate the potential and benefits of AI technologies for advancing research and personalised medicine through the linking of relevant genomics data and repositories, according to adequate organisational, regulatory, security, ethical and technical requirements.

Proposals should develop and test AI solutions for linking genomics repositories across the EU, including banks of "-omics" and health related data, biobanks and other registries (including e.g. rare disease registries), with the view of supporting clinical research and decision making. By combining sequenced genomic data and other medical data, physicians and researchers can understand better diseases at a personal level and can determine the most appropriate treatment for a particular person. The focus should be to reduce the burden of diseases for which a treatment exists and to apply such treatments in a more targeted way, to identify new evidences on the predictive value of the AI solutions and to enhance the diagnostic capacity e.g. for rare or low prevalence and complex diseases.

Proposals should demonstrate a potential to build a large-scale distributed repository of relevant genomic data and other -omics and medical data that will enable to advance validation of the new clinically impactful insights supported through AI solutions. Proposals
should ensure compliance with the relevant privacy, cybersecurity, ethical and legal rules. Sex and gender aspects should be considered appropriately. The European Open Science Cloud Initiative (EOSC) may facilitate the access of researchers to the newest data managing technologies, High Performance Computing facilities to process and analyse data and to a European Open Science Cloud list of ICT services while ensuring the appropriate data safety and protection. Proposals should address technical specifications and standards for the secure access and exchange of cross-border genomic and other health data, and collaborate with actions selected under the topic SC1-HCC-06-2020 as relevant for achieving progress towards the expected impacts.

The Commission considers that proposals requesting from the EU up 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.

**Expected Impact**: The proposal should provide appropriate indicators to measure its progress and specific impact in the following areas:

- Supporting the development and testing of AI technologies on genomics and other linked–omics and health data repositories for identifying new knowledge, support clinical research and decision making, leading to more reliable and meaningful outcomes for advancing research and personalised medicine.
- **Promoting the sharing of data and infrastructure** for prevention and personalised medicine research, concretely a European network on genomics, seeking to link it with ongoing '-omics' and human cell mapping initiatives.
- Effectiveness of AI technologies for genomics and personalised medicine.
- Measuring patient-based value healthcare outcomes for impact assessment on how genomics, personalised medicine and patient outcomes can help to implement value-based healthcare in Europe.
- Contributing to developing technical specifications for secure access and cross-border exchange of genomic and other –omics and health datasets in Europe for research purposes.
- **Facilitating interoperability of relevant registries** (including e.g. rare disease registries) and databases in support of genomics and personalised medicine research.
- Supporting the pooling of health data and resources across the EU, and demonstrate the benefits for advancing research, disease prevention and personalised medicine.
- **Contributing to standards for genomic data generation**, analysis, privacy and sharing of genomic and associated clinical and other phenotype data, including self-reported data, data from wearables, omics, and imaging.
- Contributing to the European Cloud Initiative, notably by providing open, reusable data for prevention, genomics and personalised medicine research.
- Increasing the trust of users (healthcare professionals and patients) and other stakeholders on AI solutions to process and link genomics data with other –omics and health related data for better decision-making and value-based patient health outcomes.

**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.*
DT-TDS-05-2020: AI for Health Imaging

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**Specific Challenge:** Artificial Intelligence (AI) offers substantial opportunities for healthcare, supporting better diagnosis, treatment, prevention and personalised care. Analysis of health images is one of the most promising fields for applying AI in healthcare, contributing to better prediction, diagnosis and treatment of diseases. In order to develop and test reliable AI applications in the field, access to large-volume of high-quality data is needed.

**Scope:** This action should contribute to testing and developing AI tools and analytics focused on the prevention, prediction and treatment of the most common forms of cancer while providing solutions to securely share health images across Europe.

Proposals should set up and contribute to populate a large interoperable repository of health images, enabling the development, testing and validation of AI-based health imaging solutions to improve diagnosis, disease prediction and follow-up of the most common forms of cancer. The repository should include high quality, interoperable, anonymised or pseudo-anonymised data sets of annotated cases, based on data donorship, and should comply with relevant ethics, security requirements and data protection legislation. Gender aspects should be considered appropriately. It should ensure data quality and interoperability based on common standards and open Application Programming Interfaces (APIs).

Proposers should specify measures for validating AI-based solutions for health images, such as the effectiveness of clinical decision making. There should be rigorous, peer-reviewed scientific evidence establishing their safety, validity, reproducibility, usability, reliability and usefulness for better health outcomes. It is critical to show how AI-based solutions will deal with and inform about possible failures, inaccuracies and errors. Adequate performance metrics, monitoring and evaluation criteria and procedures should be put in place. The reasoning behind AI-based conclusions and recommendations should be explained so that users can understand their situation and be able to consent or challenge any proposed course of action.

The consortium should build on relevant national and EU activities and bring together: 1) expertise to set up the infrastructure, ensuring the appropriate sharing of data quality and interoperability, 2) AI developers/expertise to experiment its content while ensuring compliance with relevant legislations.

The Commission considers that proposals requesting from the EUR 8 -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 proposal should provide appropriate indicators to measure its progress and specific impact in the following areas:
• Contributing towards the creation of a EU-wide repository of health images dedicated to the most common forms of cancer, enabling experimentation of AI-based solutions to improve diagnosis, treatment and follow-up and contribute to a more precise and personalised management of cancer.

• Contributing to developing technical, organisational and ethical standards for AI for health imaging

• Promoting access to anonymised health image data sets to be made more openly reusable across the EU for training AI applications.

• Increasing trust in AI solutions among users (healthcare professionals and patients), investors and stakeholders at industry and academia.

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.
Societal Challenge 2: Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bioeconomy

Call - Sustainable Food Security

**SFS-04-2019-2020: Integrated health approaches and alternatives to pesticide use**

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**Specific Challenge:** Plant protection and biocidal products (both covered under the term "pesticides") are used in agriculture to secure yield and ensure food and feed safety across agricultural production and the agri-food chain. At the same time, pesticides may have effects on the environment, non-target organisms, animal and human health. In the EU they are regulated and assessed for pre-market approval but tools and methods need to be further developed to better understand the overall risks and impacts associated with their individual and combined use and possible side effects. Member States and EU policies seek to reduce reliance on pesticides by designing and implementing more integrated approaches to the use of pesticides while at the same time safeguarding competitiveness.

**Scope**

**B. [2020] Alternative to contentious pesticides (IA)**

Activities will foster the development and testing of tools, approaches, strategies and/or products to reduce the risks associated with the use of contentious plant protection products and/or biocidal products in conventional and/or organic farming systems and/or the agri-food chain. They will seek for more sustainable alternatives to contentious (or, as appropriate, active substances used in) plant protection product(s) for integrated pest, disease and/or weed management in agriculture and/or biocidal product(s) for preventing and controlling harmful organisms occurring in facilities related to agricultural production and the agri-food chain. Activities should address the development, testing and demonstration of novel, more durable and sustainable approaches, products, strategies and/or tools for their application within a systems approach and cultural practices.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 15 million for scope A and EUR 5 million for scope B would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

**All sub-topics (A), (B):** Projects should fall under the concept of the ‘multi-actor approach’ including a range of actors to ensure that knowledge and needs from various sectors such as research, farming, advisory services and industry including SMEs are brought together. They
should also seek contributions from social and economic sciences to cover the broader economic, social, behavioural and environmental issues associated with the adoption of novel management strategies, including the impact on labour, safety culture and risk management on farms and economic impact for farmers. This will include looking at gender aspects, as appropriate.

Expected Impact: Activities will contribute to a better understanding of complex, interlinked issues and reduce the reliance on the use of pesticides by helping to:

- establish the impacts of the use or non-use of pesticides on the environment and human health (consumers, operators, farm workers and residents in agricultural areas);
- improve farmer, consumer and citizen awareness of and trust in global health approaches through clear and transparent and integrated assessments, pest / disease / weed prevention and control strategies for EU agricultural production and / or the agri-food chain and related communication;
- contribute to the ongoing collection of harmonised EU-wide datasets in open source collaboration and of indicators to assess and monitor trends over time and support risk management measures (scope A);
- improve monitoring of pesticide uses and pressures on human and animal health and the environment, by developing appropriate tools and integrated approaches considering various pathways (scope A);
- foster lasting transdisciplinary cooperation in the fields of life sciences, human, plant and animal health and environmental sciences and strengthen the European scientific community on global health approaches (scope A);
- introduce alternative approaches, tools, strategies and/or products for prevention and control of pests/diseases/weeds with improved environmental performance (e.g. reduced effects on non-target organisms, natural resources and the environment) in the field of plant protection and/or use of biocides related to agricultural production and activities across the agri-food chain (scope B);
- assess the potential risks and benefits of the chosen alternatives in a coherent and consistent way in view of safety and sustainability (scope B);
- improve current agronomic, ecological and cultural practices to increase the resilience of agricultural production and/or the agri-food chain against biotic stresses (scope B);
- assess the economic, social and environmental impact of the alternative proposals for the farmers and/or consumers (scope B);
- support relevant EU plant health policies and/or European risk assessments in relation to EFSA and/or ECHA activities (scope B).

In the longer-term results will strengthen an integrated health approach and foster the sustainable use of pesticides thereby reducing the exposure of human and animals, terrestrial and aquatic ecosystems, drinking water and the food chain to pesticides.

Type of Action: Research and Innovation action, Innovation action

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*
**SFS-06-2018-2020: Stepping up integrated pest management**

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**Specific Challenge:** There is a need to develop and promote more cost-effective and sustainable Integrated Pest Management (IPM) options which are based on a holistic view of agro-ecosystems. IPM is part of EU legislation promoting the sustainable use of plant protection products (SUD). The various IPM solutions being developed across Europe all differ depending on the crops, the available climate monitoring systems, the underlying knowledge of pest populations, on pedo-climatic conditions and on the agro-ecological environment. IPM decision support systems and models developed as part of national or regional research projects usually only deal with limited aspects of crop production and are validated in regional circumstances. As a consequence, it often remains unclear what the value of such a model/system may be in other parts of Europe and what the impact of climate change could be on the validity of the model. Sharing IPM decision supporting tools at European level therefore has great potential for synergies. Furthermore, on-farm demonstration of novel IPM tools would boost peer-to-peer learning across Europe and help farmers with daily management practices. The challenge is incorporating IPM into the entire farming system, and searching for synergies that result from taking a holistic approach in shaping farming systems.

**Scope:**

**B. [2020] European-wide demonstration farm network (CSA)**

Activities shall fuel a European-wide network of IPM demonstration farms, which make a direct link between research and practical farm management, thereby facilitating IPM uptake and knowledge-sharing among advisors and farmers. The network should consist of normal farms where farmers can learn in a peer-to-peer mode from their colleagues. **Practical information on the farm techniques should be made readily available to all, using open source and open data management to enable wide and long-term sharing, possibly according to specific typologies and areas. Links with administrative databases (e.g. IACS-LPIS system in Member States) and other data sources (e.g. Copernicus earth observations) should be explored.** The project should in particular incentivise the uptake of IPM practices by advisors who are using a holistic farm approach. Organic farming practices could also provide a possible source of inspiration, and forestry may be included. Besides making use of the developed decision support tools under scope A and other monitoring and warning systems, the proposals should also help promoting the variety of other existing IPM practices, comparing emerging new IPM techniques, and covering various diagnostic tools and efficient pest monitoring methods. Organic farming practices may provide a possible source of inspiration, and forestry may be included. **Proposals will support the development and European-wide sharing of training modules for farmers and for advisors, including from various national/regional sources and demonstration farm programmes.** These training modules should feed into the national Agricultural Knowledge and Innovation Systems (AKIS). Projects shall seek synergies with the national or regional EIP networks and EIP
Operational Groups, and provide input to and coordinate their strategy with the SCAR-AKIS Strategic Working Group. Proposals may include other IPM issues covered under the SUD such as application equipment, risk communication to society, etc. All collected knowledge should feed into the existing dissemination channels most consulted by farmers. As many “practice abstracts” prepared in the common EIP-AGRI format should be delivered as possible, including audio-visual material wherever possible. It is strongly recommended to cover as many Member States and regions as possible and to seek synergies with similar activities financed through other sources, e.g. the Common Agricultural Policy. Forestry may also be included. **Proposals should fall under the concept of the ‘multi-actor approach’, with a consortium based on a balanced mix of actors with complementary knowledge, including participation and activation of farmers, farmers’ groups and advisors to create co-ownership.** In this way, in the long run, results will contribute to more sustainable agriculture by reducing exposure to pesticides of humans and animals, terrestrial and aquatic ecosystems, drinking water and the food chain.

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

**Expected Impact:** Activities should create added value to existing projects by giving farmers throughout Europe a broader understanding of the existing knowledge on integrated pest management. This will support relevant plant health policies, more specifically the implementation of the SUD by demonstrating that IPM strategies work in a "real world" application, and in particular by

- helping farmers to incorporate IPM solutions in existing agricultural systems, with a focus on taking into account costs and benefits and interactions / with other aspects of agricultural management, thereby building resilience;
- supporting European platforms (such as the one created under scope A) for sharing and further developing IPM decision support systems, covering the various biogeographical areas of Europe;
- broadening and adding value to the partnerships between actors, which are developing cost-effective IPM decision support systems ready for practice;
- creating an open European network of IPM demonstration farms in all EU Member States/Associated Countries and regions, sharing data and information with a long term effect available to all, where farmers can learn in a peer-to-peer mode from their colleagues on normal farms;
- increasing awareness of the available IPM toolbox and extending the range of applications, including by incentivising the take up of IPM techniques and related advisory tools by holistic oriented advisors in their daily services;
- increasing on-farm use of IPM techniques
- developing European-wide IPM training for farmers and advisors, with modules adaptable to the regional/national contexts, the various farmers' profiles and advisory services.

**Type of Action:** Research and Innovation action, Coordination and support action
The conditions related to this topic are provided at the end of this call and in the General Annexes.

**CE-SFS-36-2020: Diversifying revenue in rural Africa through bio-based solutions**

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**Specific Challenge:** In many African regions, agriculture is predominantly subsistence-oriented, hence most farmers lack the means to invest on improving the productivity of their exploitation activities, or to undertake basic transformation of their produce. Low productivity and lack of economic diversification makes farmers vulnerable to food insecurity, and contribute to a continuous migration towards urban areas, especially among the younger generations. In many locations, unsustainable practices generate serious impacts on the environment, such as deforestation for energy or for new agricultural land, or soil degradation, which further aggravate the vulnerability of rural populations.

**Scope:** Proposals shall screen existing bio-based technologies that can be adapted and successfully transferred to rural African contexts. The focus should be on simple, robust technologies that can be operated and maintained locally, and suitable for operation at farm, village or rural community level (including mobile systems). A variety of end-products can be considered, and the business models developed should be sustainable and highly circular. Although bio-fuels or bio-energy can be part of the end-products, projects focusing mainly on these outputs are not eligible.

The selected technologies shall be integrated into one existing agri-food system without compromising food production, and without fundamentally changing established agricultural practices, provided that these are sustainable. The integrated value chain should be widely replicable, based on agricultural by-products or dedicated crops that can be incorporated through multi-cropping or intercropping practices, including agro-forestry. It shall be tested and adapted in real productive conditions, in an appropriate number of testing sites. A thorough assessment shall be performed on the agronomic, environmental, social and economic sustainability of the whole model, including gender issues and an assessment of potential risks. The project shall deliver practice guides and policy recommendations for deployment in new areas.

Projects should ensure solid collaboration between farmers, farmers associations, local industry, technology providers, research centres, extension services and policy makers. Development partners and relevant international organisations should be involved as appropriate. Proposals should include a task to cluster with other relevant projects involved in the EU-Africa R&I Partnership on FNSSA and with the cooperation platform established under SFS-33-2018. Activities should also be foreseen to cluster with the other projects financed under this topic.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 9 million would allow this specific scope to be addressed appropriately. Nonetheless, this does not preclude the submission and selection of proposals requesting other amounts.
Expected Impact: Proposed activities will deliver new and sustainable bio-based value chains that can be plugged into African agri-food systems. This will help rural communities to:

- Increase and diversify agricultural income and foster savings and investment.
- Enhance sustainability and reduce the environmental impact of domestic and economic activities, through e.g. reduced logging or nutrient recycling.
- Develop new economic activities and sectors, thus creating new jobs and opportunities.

In the longer term results will contribute improving livelihoods, enhancing food security, increasing community resilience, and reducing rural migration. Projects should also contribute increasing the innovation capacities of participating organisations, and reinforcing the scientific collaboration between the EU and Africa.

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.

Call – Blue Growth

BG-07-2019-2020: The Future of Seas and Oceans Flagship Initiative

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Specific Challenge: Our future is intimately linked to the future of the seas, oceans and coasts. The seas, oceans and coasts provide multiple ecosystem services and a wealth of resources, influence climate and provide many economic opportunities. To fully profit from the seas and oceans also in the future, we have to preserve those valuable resources and ensure that their exploitation is sustainable. Furthermore, without appropriate ocean observations for forecasting and for the protection of property and human activities, the global economy would lose hundreds of billions of euros annually. For this, we need to have the technologies for observations, integrated ocean observing systems, data management systems, and appropriate models and services. This action will contribute to make ocean observations and data management in European seas and the Atlantic Ocean fit for the future, in line with the G7 Future of the Oceans Initiative (Tsukuba Communiqué of the G7 Science Ministers). It will also support the Collaborative Research Action on Oceans of the Belmont Forum and the International Ocean Governance Communication. Similarly, ocean observation data must be available to effectively address local, national and global challenges such as the forecasting of ocean conditions and climate change, to take stock of biomass and biodiversity, to mitigate the impact of climate change and ocean acidification, to ensure food security and food safety (also in fresh water), and to contribute to the UN 2030 Sustainable Development Agenda, notably UN SDGs 2, 13, 14 and 15, and monitoring their targets for 2020 and 2025.
Scope: Proposals shall address one of the following sub-topics: blue cloud services, or ocean observations and forecasting, or technologies for observations (in 2020). Actions shall demonstrate integration, capacity and (scientific, economic etc) potential. They shall complement and build on existing observation tools and systems such as EuroGOOS/EOOS, IOOS, GEO/GEOSS, COPERNICUS Marine Service or EMODnet, European research infrastructures such as Euro-Argo ERIC and EMSO ERIC as well as funded H2020 projects such as SeaDataCloud. The interdisciplinary and cross-sectorial nature of the proposal should also apply to training activities improving the professional skills and competencies of workers and supporting the creation of new jobs in the blue economy.

[C] 2020 - Technologies for observations

Proposals shall address i) the demonstration of new and innovative technologies to measure the Essential Ocean Variables (EOV) at all depths, and ii) sensors to measure variables for aquaculture, fisheries, micro and nanoplastics, and marine litter and micro-litter, iii) the demonstration of novel approaches to observe the ocean with multiple underwater, surface, and air vehicles (surface and air vehicles are optional, but underwater must always be included) with a view to realizing the digital ocean. Optional air vehicles could potentially, among others, contribute to the development of fully documented fisheries.

Sensors should measure in-situ biogeochemical and biological EOVs and may include new or emerging EOVs (possibly defined at OceanObs19 or those needed for MSFD Descriptors) as well as technologies needed for “augmented” observatories (i.e. genome-enabled multidisciplinary observatories) to allow deeper investigation of marine biology and ecology and as sites to test the new technology. Demonstrations to advance deep sea oceanography, notably biological oceanography, by combinations of fleets of gliders, fixed stations, research vessels, etc. should reach TRL 6 or higher. Proposals may also cover the standards, protocols and communications needed for the observations, for open access to data, standards for data management and communication. Activities to transfer technologies from other sectors (for example combinations with data from satellites) will also be considered. The proposals shall also address issues such as low-power, miniaturisation, modularity, interoperability and low-cost. The proposals shall take agreed standards (for example Open Geospatial Consortium standards) into account. The development of new vehicles or other platforms are excluded from this call. Data collected (except data for testing) must be prepared in line with commonly agreed standards and be made available in a form suitable for EMODnet and clouds.

This topic is in support of the European Strategy for Plastics in a Circular Economy. Selected projects under this topic as well as projects selected under other topics in H2020 supporting the Plastics Strategy are strongly encouraged to participate in joint activities as appropriate. These joint activities could take the form of clustering of projects, participation in workshops, common exploitation and dissemination etc. The projects should describe how they will be complementary with already existing relevant national activities or other multilateral activities funded by the EU or funded jointly by several Member States. The proposals are expected to demonstrate support to common coordination and dissemination activities. Therefore, the proposals should foresee a dedicated work package for this
purpose and earmark appropriate resources. Further details of these coordination activities will be defined during the grant preparation phase with the Commission. Please note that this topic is part of the lump sum funding pilot scheme. Funding for grants awarded under this topic will take the form of lump sums as defined in Commission Decision C(2017)7151 of 27 October 2017. Details of the lump sum funding pilot scheme are published on the Funding and Tender Portal together with the specific Model Grant Agreement for Lump Sums applicable.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 6 million for sub-topic [A], EUR 12 million for sub-topic [B] and EUR 9 million for sub-topic [C] would allow this specific challenge to be adequately addressed. Nonetheless, this does not preclude the submission and selection of proposals requesting other amounts.

**Expected Impact:** Contributing to the ongoing implementation of the Galway and Belém Statements and of EU policies such as the EU Bioeconomy Strategy, the Circular Economy Strategy, the European Open Science Cloud Initiative, the Blue Growth Strategy, the Common Fisheries Policy, the EU Maritime Spatial Planning Directive, the Marine Strategy Framework Directive, the International Ocean Governance Communication and the UN Sustainable Development Goals, activities will:

In the short-term:

- Support the implementation of the G7 Future of the Seas and Oceans initiative, the Paris Climate Agreement, the UN Decade of Ocean Science for Sustainable Development, and the needs of the Marine Strategy Framework Directive.
- Deliver cloud services with work starting at technology readiness level (TRL) between 4 and 5 and achieving TRL between 6 and 7 or higher (sub-topic A).
- Achieve at least TRL 6 for ocean observations' systems and tools (sub-topic B and C).
- Contribute to regularly measure 50% of biological and biogeochemical EOVs, including in the sea below 2000 m, and predict negative impacts of ocean acidification and other selected stressors to take timely preventive measures, notably to protect aquaculture resources (sub-topic B and C).
- Lay the foundations for and contribute to the sustainable management and protection of marine and coastal ecosystems to avoid significant adverse impacts (UN SDG 14).

In the medium-term:

- Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health (UN SDG 14).
- Improve forecasting of climate changes, weather and ocean conditions to protect human activities, in support of UN SDG 14 and other relevant goals, and of the objectives of related conventions (for example on biodiversity).
- Shorten the time span between research and innovation and foster economic value in the blue economy.
- Improve the professional skills and competences of those working and being trained to work within the blue economy and in the context of open data sharing.
- Contribute to policymaking in research, innovation and technology.
- Increase data sharing and increase integration of data.
• Contribute to determining the distribution and fate of marine litter and microplastics (sub-topic C).

Type of Action: Innovation action, Innovation action Lump Sum

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

BG-10-2020: Fisheries in the full ecosystem context

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Specific Challenge: Fisheries, an important part of the blue economy, provides food, generates gross profit of around EUR 1,342 billion and accounts for more than 150,000 jobs, and contributes to coastal social cohesion and resilience. The Common Fisheries Policy (CFP) regulates access to and use of the marine living resources. The CFP seeks to apply the ecosystem-based approach to fisheries management, with fishing in line with the Maximum Sustainable Yield concept and minimizing the effect of fishing on the ecosystem. The Marine Strategy Framework Directive (MSFD) requires that fish and shellfish stocks are in good environmental status. The Maritime Spatial Planning Directive aims to regulate uses of the marine environment. The design of such policies can be better served with a holistic, integrated approach. For successful policy implementation an improvement of our predictive capacity of environmental impacts on marine biogeochemistry and productivity, food webs and ecosystem structure and functioning, is required. Considerable effort to scientifically and technically support these policy objectives goes hand in hand with filling considerable gaps in basic knowledge and providing predictive tools available for integrated management.

Scope: Building on related work done in previous research and innovation framework programmes and in other EU-funded programmes, research activities shall fill in knowledge gaps which hinder an efficient, ecosystem-based approach to the management of fisheries (e.g. biological characteristics and assessment of marine habitats; links of environmental factors and abundance, health, growth, reproduction etc. of fish stocks and human health and consumption etc.; taking into account sex and gender differences if and where relevant; relations of different trophic levels in the food chain; efficiency of management measures protecting the ecosystem, interactions with and impacts from/on other uses of the sea). The proposals shall integrate existing and new knowledge in modelling or other applied tools/methods which can be used by scientific advisory bodies in sustainable fisheries management.

Following the principles of responsible research and innovation, proposals will ensure that societal players work together during the whole research and innovation process. Proposals should also test the efficiency of the proposed solutions across Europe.
The Commission considers that proposals requesting a contribution from the EU in the range of EUR 8 million would allow this challenge to be addressed appropriately. This does not preclude the submission and selection of proposals requesting other amounts.

**Expected Impact:** In the framework of UN SDGs (1, 2, 7, 8, 12, 13, 14), the Common Fisheries Policy, the Food 2030 policy blueprint for food and nutrition security, the BLUEMED strategic research and innovation agenda and the Atlantic research and innovation cooperation, proposals will:

- Improve integrated understanding of environmental impacts on marine ecosystem and food web structure and reduce uncertainties in future projections;
- Improve fisheries management assisting EU Member States to comply in a meaningful way with the requirements of European and international marine related legislation;
- Contribute to conserve and restore fish stocks, and to regulate harvesting of fishing and end overfishing including illegal, unreported and unregulated fishing and destructive fishing practices, and to contribute to the conservation of coastal and marine ecosystems;
- Provide improved tools for ecosystem-based fisheries management which are tested, effective, discussed with scientific bodies in charge of advising on stock, fisheries and ecosystem dynamics and that are fit for the 21st century;
- Ensure that the ecosystem-based approach to the sustainable use of seas can be applied by different public bodies and in the framework of different public policies;
  - Provide improved alignment of research and innovation processes and their outcomes with the values, needs and expectations of society;
  - Contribute to a thriving fishing sector and to a thriving European blue economy, including improved professional skills and competences;

In the medium term:
- Improve the professional skills and competences of those working and being trained to work within the blue economy.
- Contribute to policymaking in research, innovation and technology.

**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.*

**BG-11-2020: Towards a productive, healthy, resilient, sustainable and highly-valued Black Sea**

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**Specific Challenge:** The Black Sea contains the largest body of oxygen-free hydrogen sulphide-rich marine waters on Earth. Any new local, national or transboundary policy measures should consider its special ecosystem characteristics, its biodiversity and its submerged cultural heritage sites.
The European Commission has been supporting the work of researchers from all the Black Sea countries to advance a shared vision for a productive, healthy, resilient, sustainable and highly-valued Black Sea by 2030. The first step was a gap analysis and a Vision Paper: A Blue Growth Initiative for Research and Innovation in the Black Sea (May 2018), leading to the drafting of a Strategic Research and Innovation Agenda (SRIA) for the Black Sea basin.

The Vision Paper identifies a series of challenges for the Black Sea basin, which are driven by a range of human-induced and natural drivers, such as pollution, maritime transport, eutrophication, climate change, and coastal hazards. The abundance of gas hydrates is a particular asset of the Black Sea that represents both opportunities and risks. Fish stocks and species diversity are under severe stress, common surveys and monitoring can provide a base for better assessment, management and prevention. The area’s marine heritage and its ecosystem services are also at risk. Black Sea societies can be more deeply connected through a bridge of knowledge, technologies, services and innovations. The EU is committed to supporting the development of solutions to solve these issues. This work will support several policies and international agreements such as the EU Integrated Maritime Policy (IMP), the EU Marine Strategy Framework Directive (MSFD), the EU Common Fisheries Policy (CFP), the EU Neighbourhood Policy, and the Bucharest Convention.

Scope: Proposals shall provide solutions for accurate predictive tools and capabilities to tackle the increasingly complex array of multi-stressors and their poorly understood interactions, including their connection with rivers flowing into the Black Sea.

Proposals shall address the fundamental Black Sea research challenges, that have been identified so far and others that may be defined as the priority-setting work proceeds, taking into account policy documents such as the MSFD reports of Romania and Bulgaria and the Strategic Action Plan of the Bucharest Convention. Proposals shall:

- Develop innovative multi-disciplinary research, building on past and on-going regional, international, as well national and EU projects/initiatives, including research infrastructures, data sharing mechanisms that will generate the knowledge needed to increase ecosystem resilience (e.g. SEAS-Era ERA-NET, PERSEUS, COCONET, SENTINEL, Marine Copernicus Monitoring Environment Service, European research infrastructures such as EMBRC, Euro-Argo ERIC, ICOS ERIC and EMSO ERIC, Black Sea Economic Cooperation, DANUBIS-RI etc.);
- Provide new knowledge to assess and mitigate the impacts of global climate change and the multiple natural and human-induced stressors in the Black Sea from land-sea interface to the deep basin.

Furthermore, proposals should provide scientific support to very early development of emerging start-ups in the region.

All data collected must be handled in line with commonly agreed standards and be compatible with EMODnet and clouds.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 9 million would allow this specific challenge to be adequately addressed. Nonetheless, this does not preclude the submission and selection of proposals requesting other amounts.

Expected Impact: Activities will support the implementation of the MSFD and the Bucharest Convention, marine and maritime research and innovation to create synergies, increase
economic benefits, and reduce hazards for prosperous, resilient and empowered communities deriving interest from the Black Sea basin.

In the short term, activities will develop:

- sustainable smart observation and monitoring systems, and assessment frameworks promoting governance for a sustainable ecosystem, mitigation of climate change impact and other stressors, and accurate forecasting for adaptive management;
- a harmonised set of working methods, standards and procedures on all aspects of coastal and marine research. This would provide compatible data, information and knowledge at the sea-basin level;
- facilities for promoting start-ups oriented towards the circular and blue economies in the region and
- new marine-based technologies by harnessing the Industry 4.0 for the Black Sea to promote safe and sustainable economic growth of the marine and maritime sectors, the conservation and valorisation of marine cultural heritage.

In the medium term:

- Improve the professional skills and competences of those working and being trained to work within the blue economy.
- Contribute to policymaking in research, innovation and technology. Activities will promote education and capacity building:
  - training and utilisation and transfer of technologies and knowledge for established and new marine and maritime-related jobs;
  - educational and vocational youth mobility related to the blue economy among the countries in the region;
  - enhanced science-policy dialogue in formulating coastal and marine policies and programmes;
  - ocean-engaged citizens and policy-makers by providing high-level scientific output, contributing to a clean, plastic-free, healthy and productive Black Sea.

**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.*

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**Call – Rural Renaissance**

**RUR-05-2020:** Connecting consumers and producers in innovative agri-food supply chains

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**Specific Challenge:** In the context of a greater market-orientation of the Common Agricultural Policy (CAP), one of the specific post 2020 CAP objectives is to rebalance the farmers' position in the food chain. The food supply chain is vulnerable to unfocused and even unfair trading due to strong imbalances between small and large operators: often farmers and small operators in the food supply chain have hardly any information or connection with the consumer to improve their offer and adapt it to the demand. A knowledge-based approach will strengthen the sector's market orientation and enhance its competitiveness, incentivising organisational innovation along the supply chain, triggered by new emerging technologies and evolving consumer demand. Zooming in on the connections between producers and consumers therefore has the potential to improve farmers' position in the value chain, as it will strengthen capacity-building. Innovative supply chains and novel food systems may tackle the downward pressure on farm gate prices and at the same time make them more sustainable, e.g. by reducing CO2 emissions. Focus on costs and margins is needed: even in innovative chains, improvement of primary producers' incomes should not be taken for granted: cases illustrate that costs attributed to the intermediaries in short supply chains may rise from 20 up until 50%. Although smaller tenders fit for small-scale producers are vital to local and fresher food in public offices, schools and hospitals, the experience needed to enable adequate public procurement approaches is generally lacking. Proposals have ample opportunity to build on sharing of good practices developed to overcome all these barriers.

**Scope:** Activities should look into concrete ways for producers to collaborate on opportunities which are both consumer driven and conducive to improving farmers' incomes (e.g. economies of scale, smarter distribution, reduction of environmental footprints, territorial approaches etc.), building on a set of good examples of efficient and applicable approaches to do so. Proposals shall collect and develop good practices for mutually beneficial cooperation, integrating the needs of primary producers and consumers in a hands-on approach. Proposals shall pay particular attention to the calculation of costs and margins for each link in the supply chain. Activities may cover infrastructure and logistics for efficient access to consumers such as smart joint logistics of producers' groups, outsourcing of transport to entrepreneurs sharing the values of the producers, optimising sales order picking and transport routes, regaining consumers' trust by shortening chains, direct sales and collaboration, etc. This should lead to a collection of good examples showing efficient access to markets, with a view to reducing costs for intermediaries as much as possible. Proposals should help to develop identity of primary producers and market position e.g. through unique selling points. They may touch upon on incentives from grassroots' initiatives like local food communities, agri-food clusters or food policy councils, the role of communities of practice and of knowledge hubs and even deal with legal constraints in so far as they support the envisaged impacts of this topic. Simultaneously, educational aspects may also be covered, such as connecting producers with consumers via open days, producer events, culinary events with local producers, food education in school curricula, celebrating local food heroes, promotion of local food labels, etc., leading to a set of concrete examples of education and awareness raising activities. Moreover, activities should support development of new public procurement approaches for offices, schools, hospitals, etc. interactively building smaller tenders to enable provision of local and seasonal food. Activities should make contracting authorities share experiences, create a dialogue with suppliers to attune supply and demand, and develop support mechanisms for smaller suppliers to meet tender requirements. Proposals shall fall under the concept of the 'multi-
actor approach’ with a consortium based on a balanced mix of actors with complementary knowledge clearly including farmers/foresters, farmers’ groups, advisors, contracting authorities and policy makers. The project’s strategy, as well as related projects RUR-06-2020 and RUR-07-2020 should be coordinated with the SCAR AKIS Strategic Working Group (SWG) with a view to cross-fertilise between projects under this topic, in order to help sharing conclusions of the project with the competent policy makers and national or regional authorities. Projects should deliver a substantial number of “practice abstracts” in the common EIP-AGRI format, including audio-visual material as much as possible.

The Commission considers that 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:**

- Developing tailor-made and practical support to set up innovative supply chains creating win-wins for producers and consumers, including through a collection of examples of good practices, illustrating mutually beneficial cooperation and a fair share for primary producers;
- **Integrating the needs of primary producers and consumers in a hands-on approach** in particular by minimising margins taken by intermediaries;
- Improved sharing of experience between contracting authorities on tendering healthy and fresh food, with a view to connecting consumers with producers in a mutually beneficial way for the longer term.

**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.*

**RUR-06-2020:** Innovative agri-food value chains: boosting sustainability-oriented competitiveness

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**Specific Challenge:** Food systems face many interlinked challenges, which jeopardise their sustainability, such as changing climate conditions, deteriorating natural resources, increasing power imbalances in the agri-food value chain, changing demographics and dietary habits. Although the stages of the agri-food value chain are strongly interconnected, the design processes of solutions to improve their sustainability are still mostly managed separately. Such an approach is often ineffective, as it can lock in the system, blocking much needed radical innovations, and/or generate unintended consequences elsewhere. Therefore, the complexity and persistence of the sustainability challenges underline an urgent need for innovative systemic approaches to redesign agri-food value chains, with a
view to unlock their full potential to deliver economic, environmental and social benefits while also addressing power imbalances between farmers and other operators. This implies that different actors across the agri-food value chains need to cooperate with each other on innovative integrated approaches to produce and distribute affordable nutritious food for all in a sustainable way. Such co-created innovative designs of agri-food value chains are emerging. Not all innovative strategies are, however, equally sustainable. There is a need to identify such innovative integrated approaches, assess them against sustainability criteria, elicit those with the highest potential to address sustainability challenges across a variety of agri-food sectors and demonstrate their benefits to serve as examples of best practice. There is also a need to understand the structure and behavioural incentives inherent in agri-food value chains, how these affect sustainability and innovation in practice, and what kind of adjustments would be desirable to facilitate good practice at a systemic level, in order to contextualise and understand the replicability of the best practices identified.

**Scope:** Building on the state of the art, the proposals shall map and assess existing innovations, and (re)design and pilot innovative systemic approaches to agri-food value chains that unlock their full potential to achieve economic, social and environmental sustainability and foster cooperation, notably involving farmers. The innovative approaches to agri-food value chains should combine diverse forms of innovation, for instance, technological, social, organisational, managerial and institutional, etc. Activities shall assess and validate the benefits of pilot activities for actors involved with a view to promote them as examples of best practice. Proposals shall apply comprehensive methods, quantitative and qualitative, to assess and benchmark economic, environmental and social performance of the innovative approaches along entire agri-food value chains. Particular attention should be paid to the potential of the innovative agri-food value chains to reduce trade-offs and to boost synergies between the economic, social and environmental dimensions of sustainability as well as to the fair distribution of costs, benefits and risks among all actors involved in the agri-food value chains. Activities should scrutinize factors enabling and hindering innovative approaches. Recommendations, best practice guidelines and toolkits for promising innovative approaches to agri-food value chains shall be developed and disseminated to reach broad audiences likely to take up and adapt the identified innovative approaches to agri-food value chains.

Proposals shall fall under the concept of the 'multi-actor approach', engaging relevant actors (including those traditionally less involved in research and innovation), such as farmers and farmers’ organizations, input and food industry, in particular SMEs, traders and distributors, food related services, consumers, environmental and social non-governmental organisations as well as public authorities, in collaboration on redesigning the agri-food value chains towards common sustainability objectives.

To maximize impact across Europe and to ensure wide dissemination of the project results, proposals should foresee a dedicated work package for cooperation with other selected projects under topic RUR-06-2020 and earmark appropriate resources. Cooperation with other selected projects under topic RUR-07-2020 is encouraged.

The Commission considers that proposals requesting a contribution from the EU of up to 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 innovation action will result in:

- long-term, win-win economic relationships between actors from agri-food chains which effectively collaborate towards common sustainability objectives;
- better understanding and fairer distribution of costs, benefits and risks amongst the actors involved in the innovative agri-food chains which are piloted, tested and demonstrated;
- a portfolio of innovative sustainable business models well-functioning in operational environment;
- strengthened farmers’ position in agri-food value chains through innovative approaches that enhance transparency, information flow and management capacity;
- enhanced positive socio-economic and environmental impacts of agri-food value chains.

In the long term, the innovations action will contribute to more competitive, efficient, resilient, sustainable and better performing agri-food value chains.

**Type of Action:** Innovation action

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

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**RUR-07-2020: Reducing food losses and waste along the agri-food value chain**

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**Specific Challenge:** Annually in the EU around 88 million tonnes of food are lost or wasted all along the agri-food value chain, from primary production to final consumption, with consequent high environmental, social and economic impacts. The problem is particularly worrying for perishable foods. Reducing food losses and waste, primarily through prevention, has enormous potential for ensuring sustainable food and nutrition security, reducing greenhouse gas emissions and lessening environmental impacts by improved resource use efficiency. Nonetheless, reducing food losses and waste all along the agri-food value chain is not straightforward, as the problem is a result of manifold and highly interlinked causes. Much is known about the causes and many innovative solutions are already available. There is, however, an urgent need for their demonstration and market replication. To avoid shifting the burden of food losses and waste from one stage of the agri-food value chain to another, it is important to coordinate the innovative actions to tackle food losses and waste along all stages of the agri-food value chain.

**Scope:** Building on the state of the art, proposals shall identify, validate and demonstrate innovative, effective ways to reduce food losses and waste, with a focus on preventing avoidable losses and waste of perishable products, all along the agri-food value chain from
primary production down to final household consumption and disposal. Proposals should consider diverse forms of innovation, e.g., technological, social, organizational, managerial and institutional, etc. that allow actors to better organize and coordinate their activities, to monitor conditions, to eliminate the many intricate direct and indirect causes of inefficiency, and, hence, to discard as little food as possible all along the agri-food value chains without compromising on food quality, including safety, and sustainability. When applicable, proposals should address requirements from relevant EU regulatory frameworks, including pre-market approval.

In order to test and demonstrate efficacy of the introduced innovative approaches and to further improve understanding of the root causes behind the current situation, proposals shall include a task to measure and monitor food losses and waste (and associated economic and environmental costs) along the agri-food value chains. Any methods used for this purpose should be compatible with the EU legislation on measurement and reporting data on food losses and waste (to be adopted by the 31 of March 2019), but may be complemented with measurement of materials not covered by the legislation (e.g., farm losses). Activities should scrutinize factors enabling and hindering innovative approaches. Recommendations, best practice guidelines and toolkits for promising innovative approaches to the reduction of food losses and waste shall be developed, taking into consideration the underlying socio-cultural factors and gender aspects, when relevant. Proposals should foresee activities to inform diverse actors along the agri-food chain, including consumers and policymakers, about the innovative solutions to food losses and waste, influencing their behaviour in relation to this issue, and supporting policy development and implementation; Proposals should seek complementarities with selected projects under topic RUR-07-2020 and other relevant EU projects, as well as contribute to relevant initiatives at EU level. To maximize impact across Europe and to ensure wide dissemination of the project results, proposals should foresee a dedicated work package for cooperation with selected projects under topic RUR-07-2020 and earmark appropriate resources. Cooperation with other selected projects under topic RUR-06-2020 is also encouraged.

Proposals shall fall under the concept of the 'multi-actor approach', ensuring solid collaboration between relevant actors, such as farmers or farmers associations, agri-food industry (including small businesses), wholesalers and retailers, food related services, consumers and policymakers.

The Commission considers that proposals requesting a contribution from the EU of up 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.

Expected Impact: In the short and medium term, proposed innovative activities will lead to a significant reduction of food losses and waste along the entire agri-food chain, and:

- increase the capacity and engagement of actors along the agri-food chain to collaborate with each other towards the common objective to reduce food losses and waste;

- raise awareness on the value of food and increase shared responsibility for food losses and waste prevention among all actors of the agri-food chain;
expand the portfolio of innovative technologies, added-value products, business models and modes of cooperation between actors across the agri-food chain with large potential for market replication and reduction of food losses and waste; the TRL of the innovative solutions can vary at the start of the project, but should achieve at least TRL 6-7;

- contribute to and/or improve understanding of the root causes behind the current situation and measurement of food losses and waste to be taken by Member States as laid down in the recently amended Waste Framework Directive.

In the long-term the innovation action will:

- identify adequate measures to promote the reduction of food losses and waste;
- increase resource use efficiency and reduce adverse environmental impacts, including emissions of greenhouse gases;
- reduce economic costs associated with food loss and waste, create jobs and increase competitiveness of the agri-food chain.

Type of Action: Innovation action

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

**LC-RUR-11-2019-2020: Sustainable wood value chains**

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**Specific Challenge**: Forests play a vital role in Europe’s economy, society and environment. Scenarios likely to keep the global warming below 2°C (Paris Agreement goal) would entail a substantial reduction of anthropogenic GHG emissions, through far-reaching changes to energy systems, land use and associated value chains. The second consumer-driven factor of GHG emissions is the construction sector (ca. 15%), implying a significant role for forest-based products. The forest-based sector can contribute to climate change mitigation through increasing sinks in and reducing emissions from living biomass, soils and wood products, and the substitution of non-renewable resources through the sustainable use of material and energy use of wood-based materials. The combined sink and substitution effects of wood value chains can provide a key mitigation option, provided that changes in fossil and biogenic carbon are taken into account in a comprehensive and balanced manner. Climate change is at the same time increasing forests’ vulnerability. Several research projects and COST Actions launched in FP7 looked into the development of innovative, resource efficient wood-based products. While ensuring the sustainability of forest production systems under changing climate conditions remains a long-term objective for the sector, a key challenge now is to further develop and deploy the technological advancements of environmental and micro/macroclimate-friendly wood-based value chains on the ground.

**Scope:**
B. [2020] Resilient forest systems (RIA)

Proposals shall aim at enhancing the adaptation of forest ecosystems (both primary and secondary) and forest production systems to the growing societal demands for forest products (i.e. wood and non-wood) and ecosystem services, considering trade-offs, climate change and vulnerability to natural disturbances (e.g. storms, droughts, pathogens, wild fires). Restoration of degraded ecosystems and natural expansion of forests, considering the long-term rural development, climate change mitigation objectives and biodiversity enhancement are also in the scope. Proposals shall encompass a varied range of forest and site types and tailored forest management systems representative of Europe's biogeographic regions. Proposals shall cover multiple parts of the production cycle and related operations, from regeneration/planting to harvesting, shall consider jointly supply (i.e. primary production) and demand (i.e. socio-economic) factors, and are expected to be interdisciplinary in nature.

Both sub-topics (A and B) are suitable for INCO and SMEs participation, and are expected to integrate technology with SSH and RRI aspects.

The Commission considers that proposals requesting a contribution from the EU of the order of EUR 10 million for sub-topic A and 5 million for sub-topic B would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: In the framework of SDG 9, 11, 13 and 15, the EU's Forest Strategy 2013, the Circular Economy Package 2015, the Paris Agreement 2015, the EU's Bioeconomy Strategy 2018, and the EU Action Plan for Nature, People and the Economy, proposals are expected to assess how they will contribute to:

- Increased resource and/or energy efficiency and added value and minimising pollution and the environmental footprint (emissions of GHG and air pollutants included) in the construction sector in the cities, by specific amounts/proportions to be specified in the proposals, by 2030 [sub-topic A];
- Enhanced connectivity of rural-urban areas and their overall contribution to a resilient, circular and competitive, forest-based bioeconomy, by 2025 [sub-topic A];
- Increased long-term resilience of forest production systems and associated value chains to climate/environmental change and societal demand [sub-topic B];
- Protection and restoration of biodiversity of primary and secondary forest [sub-topic B];
- Enhanced contribution of the forest-based sector to long-term climate change mitigation, adaptation and rural development objectives [sub-topics A & B];
- Also in the long-term, prompt a sizeable positive change to European landscapes and economies, by keeping the countryside green and serving to make cities greener, and increasing the share of both decent and green jobs [sub-topics A & B].
- Advance available solutions from TRL 4-5 to TRL 6-7 for sub-topic A and from TRL 3-4 to TRL 5 sub-topic B.

Type of Action: Innovation action, Research and Innovation action
The conditions related to this topic are provided at the end of this call and in the General Annexes.


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Specific Challenge: Despite the continued funding of scientific projects, innovative ideas and methods from practice are not captured and spread, while also often research findings are not integrated into agricultural and forestry practice. It is essential to act at EU level to remedy this because national and sectoral agricultural knowledge and innovation systems (AKISs) are insufficiently connected and organised to fully facilitate the necessary intensifying of thematic cooperation between researchers, advisors and farmers/foresters. This exchange of knowledge will foster economically viable and sustainable agriculture and forestry.

Scope: The themes must focus on the most urgent needs which farmers and foresters experience. The activities of thematic networks are summarising, sharing and presenting, - in a language that is easy to understand and is targeted to farmers and foresters - existing best practices and research findings that are close to being put into practice, but not sufficiently known or used by practitioners. The specific themes of the networks can be chosen in a 'bottom-up' way. First and foremost, they must tackle the most urgent needs experienced by farmers and foresters. If it is appropriate to solve these needs, the themes can cover sectoral or cross-sectoral issues, organisational or management solutions. The activities should pay attention to the cost/benefit aspects of the specific practices collected and summarised. A comprehensive description of the state of current farming practices relative to the chosen theme should explain the added value of the proposal and the relevance of the theme for the farmer. The proposal should also explain how it avoids duplication with ongoing or completed projects and networks. In order to better reach and capture knowledge from the targeted farmers/foresters, the networks may organise 'cross-fertilisation' through sub-networks covering, for example, a region, a language or a production system.

The result of the project should be an extensive range of useful, applicable and appealing end-user material for farmers and foresters. This information should be easy to access and understand, and feed into the existing dissemination channels most consulted by farmers and foresters at national or regional level. It should also be provided to the European Innovation Partnership (EIP) 'Agricultural Productivity and Sustainability' in the common "practice abstract" format. Proposals should fall under the concept of the 'multi-actor approach', with preferably a project duration of three years and a consortium based on a balanced mix of actors with complementary knowledge clearly activating farmers/foresters, farmers' groups and advisors. Wherever possible, details on the synergies with relevant EIP Operational Groups and interactive innovation groups operating in the context of the EIP-AGRI are expected, and, if useful, with other European Structural and Investment Fund
projects. In the exceptional event that minor testing of specific solutions would be needed, a maximum of 20% of the project budget may be used for this purpose.

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

**Expected Impact**: Activities must

- contribute to the collection and distribution of easily accessible practice-oriented knowledge on the thematic area chosen, including delivering as many “practice abstracts” in the common EIP-AGRI format as possible and as much audio-visual material as possible.
- conserve the practical knowledge for the long term - beyond the project period – in particular by using the main trusted dissemination channels which farmers/foresters consult most often, and also serve education and training purposes;
- increase the flow of practical information between farmers/foresters in Europe in a geographically balanced way, creating spill-overs and taking account of the differences between territories;
- achieve greater user acceptance of collected solutions and a more intensive dissemination of existing knowledge.

**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.*

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**Call – Food and Natural Ressources**

**FNR-01-2020: Strengthening the European agro-ecological research and innovation ecosystem**

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**Specific Challenge**: To meet increasing societal requirements as well as food insecurity challenges, agriculture must address the environmental and climate change issues relating to primary production. By using ecosystem services, agroecology – defined as the study of ecological processes applied to agricultural production systems – can strengthen the sustainability and resilience of farming and land use systems, including through agricultural practices that contribute to climate change mitigation. Agro-ecological production practices are site-specific, complex and long to setup. They must be implemented on a significant
proportion of farms to have a tangible impact on the environment. In addition to the spatial and temporal scales, the human and social factors also need to be taken into consideration to develop a coherent and integrated approach. Speeding-up the agro-ecological transition requires a strengthening of research infrastructures and **open innovation initiatives, such as living labs, with the potential to trigger large-scale change**. There is a need for mechanisms that can help sustain research infrastructures and approaches that deliver site-specific knowledge and solutions in the long term and at the relevant landscape level. Individual European research projects can contribute to launching facilities or networks but can neither sustain them in the long-run nor integrate them in bottom-up grassroots initiatives in specific territories. A successful transition to agro-ecology, as a climate friendly production system, requires the development of an ambitious and longer-term joint action at European level involving European, national and regional funders.

**Scope:** Proposals shall develop the framework for a **European network of agro-ecological living labs (LL) and research infrastructures (RI).** Such a framework should make it possible to grasp long-term agro-ecological processes at landscape level and would accelerate the transition to sustainable farming practices by promoting place-based innovation in a **co-creative environment.** Proposals shall map existing European RI, LL and similar research or open innovation activities that contribute to knowledge creation and further deployment in practice of agro-ecological production processes. They should build on the work of past and ongoing RI and LL initiatives, in and outside of the agricultural domain, and analyse how to develop relevant approaches for agro-ecological production systems. Proposals should take into account the results of national and regional projects, networks or LL launched under Horizon 2020 and previous European research and innovation framework programmes and RI related to agro-ecosystems. They should describe in detail the functioning of these initiatives and their existing capacities. They should analyse the potential to create new initiatives as well as the various methods and approaches followed, and identify potential synergies and trade-offs between RI and LL in order to propose a common set of activities to connect them. Proposals should also analyse how various stakeholders (such as farmers, up- and down-stream businesses, consumers and citizens) are engaged in these initiatives and make recommendations regarding their engagement in future initiatives. Knowledge and data management issues will be taken into consideration in particular to enable comparison and exchanges at European level.

Proposals should analyse how existing funding sources (including Horizon 2020, rural and regional development funds) are mobilised to support agro-ecological research and innovation initiatives approaches. They should explore the interest of regional and national funders in supporting such activities in the long run and provide recommendations on the funding sources that could be combined and under which conditions (e.g. application requirements, monitoring and evaluation), looking for synergies and coherence. Proposals shall identify needs for training on LL/RI methods. They should prepare a training package matching the needs of various actors and pilot training activities for potential actors to be involved in future activities.

Involvement of Member States’ authorities is encouraged in order to ensure a strategic and long-term approach, along with a broad coverage of Europe. **Transdisciplinary and integration of SSH and RRI are also encouraged.** The Commission considers that proposals requesting a contribution from the EU 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:** This topic aims at mapping, analysing and providing recommendations to strengthen the European agro-ecological research and innovation ecosystem. In the short term, the project should:

- provide a structured framework for the development of an initiative that develops synergies in this area at European level;
- increase connections in the agro-ecological community and, if mature, prepare the community for the implementation of this initiative;
- prepare the funders and raise their capacity to mobilise complementary funding sources;
- improve the human and social capital as well as skills and methods for the development of living labs and research infrastructures in the field of agro-ecology;
- improve capacity to tailor policy interventions to specific situations based on stronger evidence.

In the medium/long term, the project should provide for research and innovation projects and initiatives to benefit from the work of the network in terms of engagement of the relevant actors as well as availability of long-term-series and landscape level data regarding agro-ecological processes.

**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.*

**FNR-03-2020: A comprehensive vision for urban agriculture**

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**Specific Challenge:** Urban agriculture, in its many different forms, can provide responses to a wide array of challenges related to life in cities. In developed countries, these relate mainly to social and environmental concerns, climate change adaptation, sustainable urban development, food quality and sustainability, or to the search for new economic avenues and business models. In developing countries, urban agriculture has also proved to be a non-negligible source of food and income for the urban poor, and a valuable buffer in cases of food shortage. Consequently, interest in urban farming has significantly increased in the last years. Initiatives, projects, networks and studies have proliferated worldwide. However, these studies generally focus on just one or a few of its dimensions. There is a need to address urban agriculture from a holistic perspective, to develop a comprehensive vision about its future role and to see how European policies, including research and innovation, can support its development.
Scope: The proposals should build on knowledge and data created through recent studies and former projects and address the exchange of knowledge and experience in urban farming. In line with the principles of Responsible Research and Innovation, the proposals shall bring together actors (academia, municipal and regional authorities, urban farmers, businesses, citizen associations, etc.) representing various approaches to urban agriculture across a representative set of urban locations and countries (including least developed countries). Proposals should consider the variety of contexts and motivations that exist, and encompass all the dimensions of urban agriculture, such as:

- Role in urban development and landscapes, and potential synergies and conflicts with other land uses and economic activities, including notably urban sprawl;
- Environmental benefits (biodiversity, green infrastructure, climate, etc.);
- Social benefits, including income generation, development of social capital within cities, effects on gender balance, or improved urban-rural connections;
- New business models based on urban agriculture;
- Improvements on food security, accessibility, safety and quality as well as food literacy and diets.

The formulation of guidance and recommendations to stakeholders and policy makers, including on means to engage European citizens in urban agriculture, are included in the scope.

Cooperation with relevant projects in this domain under Horizon 2020 (including notably the project funded under FNR-07-2020) or other programmes is essential. Where relevant, the consortium should establish links with actors and networks around the world that are active in this domain.

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: Activities should contribute creating a community of stakeholders, fostering a structured dialogue and developing a holistic and balanced vision of urban agriculture. In the short term, this will help to:

- Develop and deploy urban agriculture initiatives by urban stakeholders adapted to a variety of contexts;
- Inform the development of policies supporting the development of urban agriculture and facilitate harmonisation and coordination between decision-making levels.
- Develop suitable R&I programmes to deliver the knowledge, technologies and practices needed to achieve the objectives set out in the vision.

In the longer term, this should contribute exploiting the full potential of urban agriculture to improve the quality of life, wealth, health, diets and food security and safety of urban dwellers.

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.
FNR-04-2020: Towards a European research and innovation roadmap on soils and land management

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**Topic Information**

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**Specific Challenge**: Land and soils perform a number of vital functions including the production of food and the provision of ecosystem services such as water purification, nutrient cycling, carbon storage and the support to biodiversity. Pressures on land and soils continue growing as a consequence of competing demands for the delivery of food, energy and biomaterials or the development of industries, infrastructures and urbanisation. Finally, soils are also at the center of climate mitigation efforts.

A new level of ambition is needed to tackle Research and Innovation (R&I), thereby generating the necessary knowledge, solutions to enhance the delivery of soil functions and develop capacities for a more sustainable land management across Europe and beyond.

**Scope**: Activities will create an effective framework for action which will allow pooling resources, coordinating efforts and developing a coherent portfolio of R&I activities (programme) in the wider area of soils and land management. This will include:

- mapping and assessing existing soil/land related European and international R&I activities and promoting their coordination
- analysing the needs for R&I on soils/land management as expressed through stakeholder/citizen consultation and on-going research projects
- identifying gaps, priority areas and types of action for intervention
- proposing methodologies to monitor and review a portfolio of soil related R&I activities

The details of coordination activities will be defined during the grant preparation phase with the Commission.

Proposals fall under the concept of the "multi-actor approach", thus bring together main players such as from research, research funding, policy and land management and land. Transdisciplinary and integration of SSH and RRI are also encouraged. Activities will be implemented in close cooperation with EU Commission services.

The Commission considers that proposals requesting a contribution from the EU up to 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.

**Expected Impact**: Funded activities will increase European capacities (technical, organisational) for implementing a major R&I programme on soil/land management. This will result in

- a roadmap for R&I on soils/land management developed following the concept of "co-creation" with a wide range of stakeholders
improved coordination with existing activities in Europe and globally, thereby raising visibility and effectiveness of R&I funding

- identification of potential "flagships" for testing and demonstrating solutions on key strategic domains such as boosting organic carbon content of soils in agriculture and forestry

**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.*

**CE-FNR-07-2020: FOOD 2030 - Empowering cities as agents of food system transformation**

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**Specific Challenge:** Our current food systems are unsustainable and threatened by global pressures. Environmental challenges (e.g. climate change, loss of biodiversity, scarcity and degradation of natural resources), combined with increasing social inequalities amplified by poverty, hunger and malnutrition, and urbanisation, are putting serious pressure on cities and their peri-urban interfaces.

It is estimated that by 2050, not only will food demand increase, but also over 70% of people will be living in cities. Therefore, future proofing our food systems will require a rethinking of the role of cities as agents of positive change. Cities have the potential to become ecosystems of innovation facilitating experimentation and multi-stakeholder engagement, to establish long-term evidence-based strategies that will ultimately ensure safe, healthy, sustainable and nutritious food to their inhabitants and surrounding communities.

Local authorities have a key role to play in convening, connecting and supporting food system actors and citizens across their City Region Food System (CRFS) to build and deliver transformative solutions with real societal impact based on sound science, research and innovation. However, the degree of embedding of systemic thinking into urban food policies varies greatly among cities and many of the existing fragmented initiatives focus on the production and/or the consumption side only.

The specific challenge of this topic, therefore, is to support cities to overcome existing barriers to food system transformation and develop integrated, sustainable and safe urban food system policies/strategies in line with the FOOD 2030 policy priorities (i.e. Nutrition for sustainable and healthy diets; Climate-smart and environmentally sustainable food systems; Circularity and resource efficient food systems; and Innovation and empowerment of communities).

**Scope:** Proposals shall support cities and their peri-urban interface to develop and implement urban food systems policies delivering on the four FOOD 2030 priorities...
accompanied by the deployment of concrete actions. Innovation shall be fostered via the establishment of FOOD 2030 living labs as open innovation ecosystems. The proposals shall draw key learnings from existing good practices in cities that have already engaged themselves in food policies and practices (e.g. the signatories of the MUFPP). Proposals shall include a wide diversity of cities (e.g. in terms of size and geography) that also ensure a good pan-European coverage. Furthermore, proposals shall include cities that have a ‘good track record’ in food systems transformation, as well as less experienced cities which aspire to put food systems transformation at the heart of their policy agenda.

In line with the principles of Responsible Research and Innovation (RRI), proposals shall support urban participatory policy processes that convene a wide variety of public and private stakeholders throughout the whole food system from farm to fork to gut and back. These shall include, for instance: food producers, processors, retailers, procurers, food service industry, nutritionists, universities, SMEs and local/regional business, educators, behavioural and social scientists, museums/science centres, professional associations, innovative ICT companies, banks, venture capitalists and other sources of investment, NGOs, media and citizens and taken into account gender aspects. The set-up of a living lab in each city is required. In particular, proposals shall collaborate with local authorities with a view of creating political commitment and institutionalising the expected food policy for a long-term deployment.

Proposals shall also deploy a compelling communication and dissemination strategy to share best practices throughout a broader network in order to inspire, share learnings and mobilise other cities, regions and national governments. Finally, proposals shall dedicate resources to attract additional financial investments and opportunities to ensure the long-term sustainability of the planned actions. Proposals shall require a strong centralized professional coordination to ensure cities are assisted in implementing a harmonised approach, to allow comparability assessment and to develop an aligned overarching communication strategy.

Proposals shall also foresee the inclusion of a specific and budgeted work-package in view to cooperating closely with other projects funded under this topic and with the European Commission, in particular to align with the FOOD 2030 framing, for consistent communication and dissemination, monitoring and comparability of outcomes. Furthermore, proposals shall foresee cooperation with relevant projects in this domain under Horizon 2020 (e.g. with the projects funded under CE-SFS-24-2019) and other programmes.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 12 million would allow this specific challenge to address at least 10 cities. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts and number of cities.

Expected Impact: In the framework of the objectives of FOOD 2030, as well as of the New Urban Agenda and the UN Sustainable Development Goals, in particular SDG 11 on “Sustainable Cities and Communities”, this topic is expected to support the development of sustainable, healthy and inclusive food systems policies in city-regions, where system thinking, institutional innovation and participatory planning are at the core.
In particular, the expected impact includes the following:

- the creation of new and sound evidence for policy makers in relation to urban food systems in support of policy development;
- the building up of political commitment and capacity for multi-objective coordinated strategies, roadmaps and actions between different government departments, jurisdictions and stakeholders that aim at delivering co-benefits relevant to FOOD 2030 priorities;
- the creation of a wide network of pilot European cities of different sizes and geographical settings that will develop and implement food system policies and actions including living labs, act as demonstrators of good practice, and become ambassadors for the transferability of the food system model all over Europe and beyond;
- the reconnection of citizens with food fostering behavioural change towards healthy sustainable diets and nutrition, responsible production and consumption;
- increased food and nutrition security for urban and rural dwellers;
- improved social inclusion and equity of all actors of the food systems;
- the creation of innovation opportunities, jobs and growth relevant to city region livelihoods and economic development for all actors of the food systems.

Type of Action: Innovation action

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

FNR-08-2020: Supporting the food safety systems of the future

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Specific Challenge: The EU evidence-based food safety framework is based on the General Food Law, which, among others, introduced the risk analysis principle to underpin food safety policy making and established the European Food Safety Authority. Recent consumer concerns on the transparency of the process of safety assessment of our foods as well as technological developments and innovations have shown that there is a need to reflect on the EU food safety system of the future. The challenge requires fostering coordination and integration among different food safety stakeholders in order to ensure that the science and infrastructures needed to support evidence-based policies of the future will be timely available.

Scope: Proposals shall aim at developing a research and innovation platform for collaboration and coordination across food safety stakeholders in Europe. Actions shall engage key stakeholders such as National Food Safety Authorities, relevant EU Agencies, Commission Services, policy makers, scientists and civil society with the objectives to: i) map the state of play in food safety research and innovation in the different Member States and
Associated Countries; ii) strengthen research and innovation capacity to ensure that Europe continues to be the global leader on food safety standards; iii) exchange of knowledge and data across the scientific community and policy actors including relevant EU Agencies; iv) improve coherence and reduce the overlap between national and EU funding in Food safety research. v) develop innovative approaches to communicate both on food safety research and innovation as well as on risk assessment procedures in the area of food safety in a manner that citizens are properly informed and engaged in taking into account gender aspects, thus contributing to boosting consumers' confidence on the evidence-base for food safety systems and vi) explore avenues for long-term science-policy-society interfaces.

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

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.

Expected Impact: In line with principles, requirements and procedures of the General Food Law, in the short/medium term proposals will:

- Deliver a platform for European cooperation at multi-partner level on food safety that builds on research and innovation (R&I) and policy coherence, exploits synergies and capabilities between countries and regions and enhances public confidence.
- Develop innovative models for collaborations and knowledge exchange across food safety actors and develop networks to promote coherence and harmonisation across the food safety stakeholders throughout the Member States.
- Identify integrated and reliable resources (e.g. data repositories, accredited laboratories, individual roadmaps, inventories) accessible for the food safety stakeholders.
- Deliver the basis for the development of joint trans-national research programmes and alignment of national research agendas.
- Develop a coherent Food Safety Strategic Research and Innovation Agenda (SRIA) which shall also address consumers' expectations, emerging technologies and policy priorities.
- Deliver models to inform civil society of the science-based risk assessment process providing clear guidance on dissemination models.
- Deliver logistic and technical support for permanent structure in the future ensuring that research and innovation will support food safety policies.

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.
Specific Challenge: Marine litter is high on the scientific and political agendas and of major concern for European citizens. More than 80 percent of marine litter is plastic. It is estimated that by 2050, more plastic could be in the ocean than fish. It can be found on beaches (mostly produced locally), on the ocean surface, in animals and on the seafloor. Microplastics can get into the food chain, together with the integrated and adsorbed toxins. It is estimated that each year 5 to 13 million tonnes plastics reach the seas and oceans (worldwide), becoming eventually the main source of microplastics. In addition to possible health risks, the damage to marine ecosystems and the blue economy (tourism and other maritime sectors) due to plastic litter are enormous.

Therefore, urgent action is needed both for the prevention and for the removal of existing marine litter, notably plastics and microplastics. For this topic, a demonstration of the removal of marine litter and research is being proposed, highlighting how the environment is impacted by the removal, and the corresponding impacts in terms of ecosystem and economic recovery.

Scope: The overall goal of this topic is the demonstration of approaches or technologies to improve marine spatial planning and conservation (or even restoration) of coastal ecosystems. More specifically, this topic is for the demonstration of technologies to clean the seafloor and the surface of nearshore waters, and possibly the water column, from historically accumulated plastics and micro-plastics as well as from other accumulated marine litter and the assessment of effectiveness and impact. Accompanying research will have to address impacts on coastal ecosystems’ food chains, biodiversity and functioning, fisheries, aquaculture, Marine Protected Areas, wild life and local economies (all of these) 6, 12, 18 and 24 months after the (start of the) cleaning. At the end of the project, the consortium is expected to identify a way forward and lay the foundations for upscaling with a view to a future potentially automated removal of historically accumulated marine litter (legacy), in particular at hot-spots of accumulated marine litter.

The inclusion of actions to reduce other pollutants and effects of stressors is an advantage.

Projects shall demonstrate the effectiveness of an (or several) automatic or remotely controlled wireless device(s) capable of collecting plastics and other marine litter of reasonable size (larger micro-litter and macro-litter up to a meter or so). The proposed solution must be able to work at the sea surface and on the seafloor/beach. The demonstration has to be for longer periods of time (several months on one site; several sites at the same time are acceptable). The marine litter must be sorted and reused (project must include demonstration of feeding of litter into reuse/recycling chains) in line with the circular economy and the plastics strategy.

The environmental impact, notably on biota, has to be minimized and assessed.

The project must include demonstrations in different sites, including beaches, harbours and shallow seafloor.
This topic is in support of the European Strategy for Plastics in a Circular Economy. Selected projects under this topic as well as projects selected under other topics in H2020 supporting the Plastics Strategy are strongly encouraged to participate in joint activities as appropriate. These joint activities could take the form of clustering of projects, participation in workshops, common exploitation and dissemination etc. The projects should describe how they will be complementary with already existing relevant national activities or other multilateral activities funded by the EU or funded jointly by several Member States. The proposals are expected to demonstrate support to common coordination and dissemination activities. Therefore, the proposals should foresee a dedicated work package for this purpose and earmark appropriate resources. Further details of these coordination activities will be defined during the grant preparation phase with the Commission.

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

**Expected Impact:** Contributing to the ongoing implementation of EU Policies such as the EU Bioeconomy Strategy, the Circular Economy Strategy, the European Strategy for Plastics in a Circular Economy, the European Integrated Maritime Policy, the Marine Strategy Framework Directive and the UN Sustainable Development Goals, activities will:

**In the short-term:**

- Achieve at least TRL 6.
- Achieve a removal of 90% of macro-plastic litter and a substantial fraction of micro-litter in the demonstration areas reducing the clean-up cost to the local blue economy.
- Increase availability of efficient and environmentally sustainable technologies to remove existing marine litter.
- **Contribute to awareness rising of citizens about the importance of prevention to avoid environmental damage and high costs (for the community and the tax payer instead of the polluter).**
- Contribute to the sustainable management and protection of marine and coastal ecosystems to avoid significant adverse impacts (UN SDG 14).

**In the medium-term:**

- Obtain no more damage from marine litter to the local blue-economy and marine ecosystems services.
- Achieve 80% reduction of micro-plastics in shellfish in treated areas (or other locally important small marine animals).
- Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health (UN SDG 14).
- Ensure that collected marine plastics are reused or reconverted in a way that is in line with the European Strategy for Plastics in a Circular Economy.
- Shorten the time span between research and innovation and foster economic value in the blue economy.
• Improve the professional skills and competences of those working and being trained to work within the blue economy and in the context of open data sharing.
• Increase data sharing and increase integration of data.
• Contribute to determining the distribution and fate of marine litter and microplastics. In the long-term:
  • Achieve 80% reduction of micro-plastics and plastics in non-migratory birds species in the areas where cleaning technologies are being used.
  • Achieve substantial reduction of micro-plastics originating from macro-plastics locally.

Type of Action: Innovation action

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

FNR-10-2020: Public engagement for the Bioeconomy

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Specific Challenge: The bioeconomy includes sectors and systems that use, produce, process or are driven by biological resources. The successful transition towards the bioeconomy requires a profound transformation on both the supply and the demand sides of the economy and involve different multipliers (consumers, retailers, etc.). It is therefore important to raise public awareness and knowledge about the environmental and socio-economic impacts of activities on all bioeconomy areas among a wide range of stakeholders.

Scope: Proposals will build upon sectoral communication activities at national, regional and local level through awareness raising about the bioeconomy at large for European citizens. The actions shall promote the environmental and socio-economic benefits of bioeconomy areas through awareness-raising and education on sustainable production, consumption and lifestyles.

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.

Expected Impact: In the framework of the UN SDGs, this action will contribute to the implementation of the updated 2018 EU Bioeconomy Strategy. It will also contribute to the overall awareness by European citizens about the bioeconomy.

In particular, this action will help European citizens (including young people) to:

• Be aware of the bioeconomy and all its areas;
SwafS Opportunities

- Be knowledgeable on sustainability and environmental protection;
- Raise awareness on sustainable production, consumption and lifestyles;
- Make more informed choices in the future when buying and consuming products;
- Encourage the deployment of Bioeconomy Strategies at local level;
- Contribute to the European Bioeconomy Network.

**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.*

**FNR-11-2020: Prospecting aquatic and terrestrial natural biological resources for biologically active compounds**

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**Specific Challenge:** Global biodiversity remains a largely untapped source of natural bioactive molecules and compounds. Such molecules offer unmatched chemical diversity and structural complexity, together with biological potency and selectivity. While some of the natural chemodiversity has been studied, resulting in open access and proprietary compound libraries, the potential for developing commercial products is far from exhausted. There is still significant potential for application in various industries, such as high-value agro-chemicals (e.g. natural plant protection products), food and feed ingredients (such as nutraceuticals), pharmaceutically active ingredients, cosmetics, flavourings etc. On conservative estimates, these compounds represent a global market of EUR 150 billion and global industrial revenues of EUR 19 billion.

The main challenges tackled in the topic are, depending on the source:

- technological readiness for the sustainable exploitation of natural resources, linked with;
- scarcity of the source natural biological material (e.g. in case of protected / rare species);
- low concentrations of the target compounds, leading to the difficulties in obtaining sufficient amounts of the pure molecules.

The challenge is to match their sustainable sourcing and processing with efficient and cost-effective use. *This calls for close cooperation between industrial and academic partners, with due consideration for health and environmental legislation, and informed public engagement.*

**Scope:** Proposals should cover the entire development pipeline with a focus on:

- biodiscovery (prospecting natural biological resources from land and sea), i.e.:
identifying suitable molecules;
verifying their claimed benefits;
optimising technological exploitation, including cultivation strategies for selected production systems and metabolic engineering to ensure high productivity and purity;
assessing safety, and
developing products (final formulation) and their commercialisation, in Europe.

Proposals should focus on small molecules, with novel bioactivities, qualities and applications, in particular from unusual or underutilised sources, and on our understanding of their relevant chemical, genetic, physiological and environmental make-up. Special attention should be devoted to ensuring sustainable sourcing from the raw feedstock, to avoid overexploitation, taking into account recent technical advances in molecular biology (e.g. metabolomics, new gene mining and optimisation techniques, development of suitable host production platforms). Proposals could explore in vivo or in vitro approaches to study the interactions between various biological entities (e.g. through symbiotic or defence relationships) as a source of interesting bioactive properties. They should:

• prove the techno-economic feasibility and effectiveness of a chosen production route;
• commit to assessing, as part of the project, the environmental and health impacts of the developed products or processes, using life-cycle assessment (LCA) methodologies based on available standards, certification, and accepted and validated approaches, and
• guarantee biodiversity preservation and comply with relevant international rules on access to biological resources, their sustainable use and the fair and equitable sharing of benefits from their utilisation, with the national regulations in the source countries and with the Convention on Biological Diversity and its Nagoya Protocol.

In line with the EU’s policy on responsible research and innovation, dissemination and public engagement via modern communication and dissemination tools will be an essential element of the projects that are funded. Projects should involve an analysis of the state of the art to avoid duplications and overlaps with past or ongoing research. Cooperation with other selected proposals under this topic is encouraged.

Proposals should address one of the following sub-topics:

A: Prospecting terrestrial natural biological resources for biologically active compounds

Actions must focus on land-based biological natural resources.

B: Prospecting aquatic natural biological resources for biologically active compounds

Actions must focus on marine and fresh-water biological natural resources.

The Commission considers that proposals requesting an EU contribution of around EUR 7.5 million would allow this specific challenge to be addressed appropriately. This does not preclude the submission and selection of proposals requesting other amounts.

Expected Impact: Activities will support the sustainable biodiscovery and use of natural biological resources from diverse environments and ecosystems, allowing better assessment
of the selected bioactivity potential. This will increase capacity in the European biotechnology sector and other industries to respond to society’s needs. Specifically, activities will contribute to:

Short/medium term:

- developing novel natural, sustainable and ‘eco-friendly’ products with significant bioactive properties, especially as relevant for the pharmaceutical, cosmetic, agrochemical or marine sectors and applications. These will deliver clear-cut benefits for consumers by being more effective and/or eco-friendly, cheaper, and more readily accessible than existing alternatives;
- developing sustainable exploitation, cultivation and processing methods based on promising species/organisms, and chosen production routes;
- increasing public/private cooperation in European biotechnology, while integrating its sectors e.g. ‘green’ (plant), ‘blue’ (marine), and ‘white’ (industrial); and;
- increasing public knowledge of biodiversity potential and, if relevant, ecosystem interactions, and their impact on bioactive response;

Long term:

- reducing the pressure on the harvesting of wild populations; and;
- ensuring the environmental and economic sustainability of the entire process, inter alia by reducing and extracting waste via the efficient use of biomass (cascade approach).

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-FNR-14-2020: Innovative textiles – reinventing fashion

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Specific Challenge: The main market driver in the textile sector is the fast-growing demand for products and the need to respond to it without a negative environmental impact. The proportion of bio-based textile fibres has been falling steadily for decades, mainly because of the environmental limits of cotton production and the progress made (e.g. in terms of reduced costs) in the field of synthetic fibres. However, over a third of textile fibres are still bio-based.

A shift in the market from petrochemical to bio-based fibres will require new processing technologies and huge market uptake of sustainable bio-based materials other than cotton, wool and silk. Of all natural fibres, cellulose has seen the fastest increase in all textile substrates in recent years. Other all-natural fibres are under development or have been introduced in niche markets. In addition, small proportion of new bio-based polymer fibres can already be found in specific applications.
The challenge is to develop processing technologies and create an innovative and sustainable bio-based textile economy based on circular economy principles, thus making efficient use of resources, radically improving recycling, phasing out plastic microfibre release and accelerating the development and adoption of sustainable circular business models.

**Scope:** Activities should address:

- the development of innovative, techno-economically feasible materials and processes for the production of resource-efficient, sustainable and functionally performing bio-based textiles;
- the technical, environmental and economic aspects of bio-based textile recycling, focusing on quality, i.e. targeting up-cycling, or at least, recycling into the same or similar quality applications; and;
- the use of new bio-based materials and the design of textiles that are either biodegradable or do not shed microfibers and have the properties needed for performance applications.

Work on the sustainability and safety of end products should embrace the use of resources as a whole and incorporate the established standards for products with a small environmental footprint, from life-cycle assessment to eco-labelling. In addition, activities should investigate the elements needed for the development of innovative circular business models for bio-based textiles.

In line with responsible research and innovation principles, activities should support the development of international fora and platforms that facilitate systemic innovation and uptake by enabling actors in the value chains, from industry to civil society and public authorities, to cooperate to improve circularity in the bio-based textiles economy. The interdisciplinary, cross-sectoral approach should also apply to training activities to improve professional skills and competencies, and to support the job creation in the bioeconomy.

Proposal should deliver solutions with work starting at technology readiness level (TRL) 5 and reaching TRL 6 or higher, where technological innovation is involved.

Cooperation with other selected proposals under this topic is encouraged.

The Commission considers that proposals requesting an EU contribution of around EUR 7 million would allow this challenge to be addressed appropriately. This does not preclude the submission and selection of proposals requesting other amounts.

**Expected Impact:**

- foster innovations that enable bio-based textile value chains to become more resource efficient, circular, and reduce their carbon, greenhouse gas and water footprint, in line with climate, energy and sustainable development goals (e.g. UN SDG 14);
- prevent and significantly reduce plastic microfibre pollution;
- improve the efficiency and technological performance of bio-based textile recycling;
- strengthen the market position and increase the market share of bio-based textiles;
- deliver results in a form that allows for efficient feedback into policymaking in research, innovation and technology, in particular in the EU circular economy;
SwafS Opportunities

- demonstrate solutions and develop strategies for the circular innovation of the whole innovative bio-based textile system, building on a shared vision and enhancing cooperation between all stakeholders; and;
- raise awareness and create a better framework for systemic innovation and uptake of results through broad stakeholder engagement.

**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-FNR-15-2020: A network of European bioeconomy clusters to advance bio-based solutions in the primary production sector**

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**Specific Challenge:** Inclusive and sustainable bio-based business models (e.g. cooperatives, producer associations and higher-level structures such as clusters) offer a major opportunity for communities to combine the local creation of value, societal engagement and environmental protection. This may lead to:

- reduction of the negative environmental impacts of unsustainable production and consumption patterns;
- greater circularity of local resources;
- better use of eco-system services and goods originating in primary sectors (e.g. high biodiversity and measures to meet climate targets).

However, the adoption of such models is often hampered by factors at the level of stakeholders such as insufficient awareness, cooperation and innovation exploitation. The challenge entails developing strategies that deliver the above-mentioned principles, while mobilising stakeholders to adopt sustainable and inclusive business models, based on technologies and under-valorised or under-utilised resources, suitable for use on a small scale and easy to replicate and adapt to local conditions.

**Scope:** The action will stimulate adoption of the business models by the relevant stakeholders (especially primary producers), with a clear emphasis on agriculture and forestry. It will achieve a sound geographical balance, and may cover all primary biomass sectors. **Proposals should establish a pilot network of national/regional ‘bioeconomy clusters’ gathering relevant actors in the bioeconomy (e.g. EU, national/regional policy and funding bodies, industry, academia, farmer associations and cooperatives, industry, researchers, civil society and NGOs).** These clusters should develop appropriate strategies for the deployment of bio-based solutions involving the primary production sector, tailored to regional conditions and assets, and exploiting synergies between policy instruments, such as the common agricultural policy, regional funds and relevant national programmes.

At a minimum, the action should help address:
- lack of awareness and practical knowledge among stakeholders (especially primary biomass producers) as to the potential of sustainable business models in the bio-based sector to create economic, environmental and societal value through the production and/or use of hitherto unexploited bio-based resources;
- low degree of cooperation and networking at all levels; and;
- inadequate transfer of technology and exploitation of innovation, which too often impede uptake of these business models.

To avoid overlaps, this action will build on the state of the art including past and ongoing EU-funded projects.

The Commission considers that proposals requesting an EU contribution of around EUR 2 million would allow this challenge to be addressed appropriately. This does not preclude the submission and selection of proposals requesting other amounts.

**Expected Impact:** The action will implement the 2018 EU bioeconomy strategy.

More specifically, it will:

**Short/medium term:**
- contribute to the establishment of fully integrated and diversified business models and value chains in ‘bio-based sectors’ by mobilising a wider and more inclusive set of primary biomass actors;
- develop and disseminate practical recommendations based on concrete success stories from agriculturally diverse areas of Europe;
- raise awareness among the stakeholders in the bio-based sector (including primary producers) of sustainable, inclusive and circular bioeconomy objectives including the underpinning EU policy objectives on climate targets and biodiversity protection, of opportunities linked to the sector;

**Long term:**
- contribute to the creation of skilled jobs in rural economies, and increase and diversify income for primary biomass producers, thus raising awareness among policymakers and in society at large of the opportunities in the bio-based sector;
- stimulate local value creation, circularity and environmental and socio-economic sustainability for easy replication in rural areas; and
- establish a dynamic enabling framework for the deployment of bioeconomies, combining the sectoral and territorial dimensions.

**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.*

**FNR-16-2020: Enzymes for more environment-friendly consumer products**

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Specific Challenge: It has been demonstrated that the unique selectivity and catalytic activity of enzymes gives them significant potential to support sustainability, reduce environmental pollution, lower processing costs and enhance product performance and functionalities. Growing environmental concerns have contributed to the rapid growth in the market for enzymes and their use in various industrial and speciality applications. Enzymes find application in the processing phase and in the formulation of consumer products such as washing agents, textiles, personal care, cosmetics or nutraceuticals. The specific challenge is to expand the use of enzymes to respond to the steadily growing demand for greener consumer products, combining economic competitiveness and greater sustainability.

Scope: Proposals should address the development of novel or improved enzyme(s) for the processing and/or the formulation of one or more of the following consumer products: washing agents, textiles, personal care products, cosmetics and nutraceuticals. The approach could involve bioprospecting or the exploitation of existing databases. Activities should include assessment of the environmental impact of the developed approach. They should aim at a strong improvement of environmental performance, against the state of the art, linked to enzyme functionality. In line with the principles of Responsible Research and Innovation, close research collaboration with all relevant stakeholders is needed to ensure future industrial implementation and market uptake.

Proposals should:

- involve the development of an efficient production system of the enzyme(s) in question, together with downstream processes and methods for enzyme formulation and inclusion in the consumer product(s);
- (where they concern the development of enzyme-containing consumer products) cover the management of safety aspects, including appropriate risk assessment;
- combine the development of the targeted enzyme(s) with the development of generic platform technologies with a view to faster transition from lab to market. This should be based on an interdisciplinary approach and could involve: novel technologies and methods such as the screening, design, creation or optimisation of novel high-performance enzymes as well as computational methods and tools for effective big-data analysis.

Cooperation with other selected proposals under this topic is encouraged.

The Commission considers that proposals requesting an EU contribution of around EUR 6 million would allow this specific challenge to be addressed appropriately. This does not preclude the submission and selection of proposals requesting other amounts.

Expected Impact:

short/medium term

- broaden the range of enzymes used in the production or formulation of consumer products;
• reduce the environmental impact of those consumer products;
• improve the overall sustainability and innovation capacity of the bio-based sector through the use of innovative enzymes;
• develop strategies to speed up the transition from lab to market for the development of enzyme-based innovation, on the basis of closer and interdisciplinary cooperation;
• deliver results in a form that allows for efficient feedback into policymaking in research, innovation and technology, in particular in the 2018 EU bioeconomy strategy;
• raise awareness and create a better framework for systemic innovation and uptake through broad stakeholder engagement; and
• enhance the competitiveness and sustainability of European industry, including the biotechnology and consumer products sectors.

**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.
Societal Challenge 3: Secure, clean and efficient energy

Call – Building a low-carbon, climate resilient future

LC-SC3-B4E-3-2020: Upgrading smartness of existing buildings through innovations for legacy equipment

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Specific Challenge: An essential part of Europe's clean energy transition is the changing role of buildings from consuming energy to actively controlling and optimising indoor environment while contributing to energy system flexibility by ensuring distributed energy generation from renewable energy sources, energy storage, facilitate smart charging of EVs, smart metering, load reduction through energy efficiency and load shifting through demand response. Innovative technologies will enable smart buildings to interact with their occupants and the grid in real time and to manage themselves efficiently, so as to become an active element of the energy system. Intelligent and connected devices, smart sensors and controllers, supported by the development of new business models for new energy services, will create new opportunities for energy consumers.

Today, the existing building stock represents the main challenge for a more efficient energy use, in buildings as well as across the whole energy system. The smart readiness of buildings may evolve faster for devices and systems easily replaced and installed, than for other parts of the building's equipment such as HVAC and DHW systems due to higher costs of replacement, longer lifecycles and difficulties related to integration in buildings. This installed equipment remains highly relevant for buildings interactions with the energy system, making its upgrade to higher levels of smartness an essential step. The revised Energy Performance of Buildings Directive introduces a Smart Readiness Indicator (SRI) to reflect the level of services offered by a smart building. Once established, this indicator will give a framework to assess the smart readiness of buildings and building units to adapt operation to the needs of the occupant and the grid and to improve energy efficiency and overall performance.

Scope: Proposals should develop and demonstrate cost-effective low-carbon technological solutions to manage energy within existing buildings and interact with the grid providing energy efficiency, flexibility, generation and storage, based on user preferences and requests. These solutions should be aimed to upgrade existing buildings, either residential or tertiary, using automation and IT to offer new services and control to the building users, thereby improving their comfort and increasing their satisfaction. This upgrade should translate into improvements in the areas put forward by the revised EPBD, in relation to the smart readiness indicator.

Proposals should demonstrate how the smart systems, smart controls, smart metering and smart appliances can be integrated seamlessly in existing buildings to interface and/or to
control the major energy consuming domestic appliances that are already installed. These pilots should involve several types of domestic appliances and technical building systems with longer lifecycles (boilers, radiators, DHW preparation, motors for ventilation, windows opening and shading; lighting etc.) and with shorter lifecycles (dryers, washing machines, fridges, etc.), testing several types of control modes (ON/OFF, power modulation, etc.) possible for a given type of appliance. Recharging points for electric vehicles, vehicle-to-grid and other forms of energy storage should also be incorporated in the pilots. The proposed solutions should not adversely affect the original functionalities, product quality, lifetime, as well as warranties of the appliances.

Besides the pilot demonstrations, proposals are expected to include clear business model development and a clear path to finance and deployment. Key partners should have the capability and interest in making the developed solution a core part of their business/service model to their clients.

These business models and exploitation strategies should target the broad uptake of the proposed smart systems into specific building typologies in Europe and their integration with evolving electricity markets, e.g. dynamic pricing or other services and information offered by energy suppliers and/or aggregators. Integrations with other energy networks, e.g. DHC, or other services or IT solutions not related to energy can also be considered. The solutions should focus on cost-effectiveness and user-friendliness: easy installation and maintenance, maximising consumer comfort (e.g. self-learning) and information on own consumption (e.g. recommendations to the user in order to maximise savings) as well as on gains from its contribution to grid operation.

These solutions should build on innovative technologies, initiatives and approaches contributing to building smartness: semantics, data models, data layers, protocols, software building blocks, APIs, middleware, solutions for smart services, standards, relevant industrial consortia or technology initiatives, etc. Interoperability is essential to ensure the required smart readiness, in particular integration with legacy equipment, user-friendliness and broad market uptake.

Projects are required to follow the H2020 guidance on ethics and data protection, taking into account digital security, privacy and data protection requirements including the compliance with relevant directives/regulations (e.g. NIS, eIDAS, GDPR) and relevant National Legislation.

A realistic estimate should be provided on the total energy savings/year and on the impact of the innovations demonstrated in the project on the total power available for cost effective demand response actions. The projects should involve technology providers (e.g. manufacturers of appliances, movable envelope components, smart control/ home systems providers), energy services providers (aggregators and/or suppliers and/or ESCO's), user representatives, electricity system operators and other actors as relevant.

The activities are expected to be implemented at TRL 6-8 (please see part G of the General Annexes).

The Commission considers the proposals requesting a contribution from the EU of between 3 to 4 million would allow this specific challenge to be addressed appropriately. Nonetheless this does not preclude submission and selection of proposals requesting other amounts. This topic contributes to the roadmap of the Energy-efficient Buildings (EeB) cPPP.
Expected Impact: Proposals are expected to demonstrate the impacts listed below using quantified indicators and targets wherever possible:

- Primary Energy savings triggered by the project (in GWh/year);
- Investments in sustainable energy triggered by the project (in million Euro);
- Upgrade of existing buildings to higher smartness levels, including a significantly enlarged base of existing building equipment and appliances monitored by energy management systems and activated through demand response actions;
- Reduction in energy consumption and costs, exceeding the additional consumption from IT and its cost.

Additional positive effects can be quantified and reported when relevant and wherever possible:

- Reduction of the greenhouse gas emissions (in tCO2-eq/year) and/or air pollutants (in kg/year) triggered by the project.

Type of Action: Innovation action

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

LC-SC3-B4E-5-2020: Integrated design concepts for energy-efficient ICT in buildings

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Specific Challenge: The demand for data processing is expected to grow in the coming years. Consolidation is quickly replacing a multitude of small, remote and inefficient data centres with big and more resource and energy efficient data centres. This tendency however does not address specific delay- and security-sensitive small data centres. Moreover the emergence of edge computing, Internet of Things and Software Defined Networks (Network Function Virtualisation) will increase the amount of small data centres at the edge of the network. This is also the situation for server rooms in buildings.

These server rooms, small data centres or other ICT equipment in building (e.g. telephone cabinets) should become more energy efficient, better integrated with the buildings in which they operate, and should maximise where possible the integration of intermittent renewable energy sources, district cooling systems, and synergies with buildings’ energy management systems (e.g. space heating and cooling).

Scope: Proposals should investigate innovative design concepts and advanced ICT solutions for integrated design of server rooms and small data centres in buildings (based on state-of-the-art sustainable data centre designs such as the Open Compute Project or similar), covering as many as possible of the following areas:

- Optimal energy performance of the proposed design concepts,
- Innovative and energy efficient cooling technologies and/or solutions,
- Integration with buildings’ energy management system and energy-consuming systems (using European and global communication standards such as SAREF), taking into account building usage,
- Integration with intermittent renewable energy sources
- Waste heat valorisation (e.g. recovery, conversion, usage in local low-temperature heat networks to serve urban areas), while minimising the total waste heat production,
- Geographical and temporal workload balance,
- Elimination of unnecessary repeated power conversions (AC/DC),
- Operation of ICT equipment in a wider range of temperatures (to mitigate cooling and airflow needs in data centres but also heating needs in telecommunication cabinets/booths in the field).

For the purposes of this action, proposals should address server rooms or small data centres, with an IT Equipment energy requirement of a maximum of 250 kW or lower per pilot. Proposals should focus on new and/or existing small edge or sensitive (delay and security) data centres and include at least three pilots in three different countries (one pilot in each country) in different climatic conditions.

Proposals should deliver guidelines and good practices to support building designers (architects, engineering companies, etc.) and managers (IT or facilities managers) in approaching the design of server rooms and small data centres in buildings, taking into account the characteristics of the building, the systems and the expected use. These guidelines should include in particular flexible design concepts (including ICT solutions) for server rooms and small data centres in buildings, readily applicable to a large number of typical configurations (e.g. office buildings in urban areas). These design concepts should be optimized in terms of energy efficiency and use of intermittent renewable energy and cover building envelope, technical building systems and server room(s), and related connections / synergies. The design concepts should also include lessons learnt from the operation of systems. They should be applicable and scalable in Europe, including application under different climatic conditions.

Proposals should include an evidence-based evaluation of the impacts (in terms of energy savings, CO2 emissions and other possible side effects, e.g. on comfort of occupants) of the proposed design concepts. This evaluation should rely on relevant indicators over a representative period of time on a limited set of buildings, systems and server configurations.

This evaluation should follow a well-defined strategy that can rely partly on modelling and simulation but should also include tests and experiments in close to real-life conditions, leading to at least TRL 7 (please see part G of the General Annexes).

Projects are required to follow the H2020 guidance on ethics and data protection, taking into account digital security, privacy and data protection requirements including the compliance with relevant directives/regulations (e.g. NIS, eIDAS, GDPR) and relevant National Legislation.

Proposals should also include convincing dissemination strategies to reach out to relevant business players (e.g. architects and engineering companies).

Proposals should include the development of business models to trade heat, cold, electricity or energy security and storage. Large and medium data centres have been addressed by different actions under H2020 or other research programmes. Proposals should benefit from the transfer of lessons learnt from these larger systems.

Proposals could build upon the results of previous and ongoing projects.
The Commission considers that proposals requesting a contribution from the EU of between EUR 2 and 3 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. This topic contributes to the roadmap of the Energy-efficient Buildings (EeB) cPPP.

**Expected Impact:** Proposals are expected to demonstrate, using quantified indicators and targets wherever possible:

- Innovative design concepts for ICT in buildings, optimizing energy efficiency and usage of intermittent renewable energy.
- Demonstration and quantitative evaluation of impacts of innovative design concepts.
- Dissemination of the design concepts and related benefits to relevant market players.
- Bring ICT specific innovative energy efficiency technologies and solutions, already developed by research projects, to market faster and cheaper.
- Achieve a high share of the existing ICT energy consumption covered by sustainable energy resources.
- Demonstrate lower environmental impacts in the short and long term of the installation/construction/operation/decommissioning.
- Facilitate the identification and removal of non-technical barriers to accelerate wide deployment of innovative solutions for energy efficiency in the data centre sector
- Power Usage Effectiveness (PUE) lower than the best performing small data centre solutions in a given location.

**Type of Action:** Innovation action

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

**LC-SC3-B4E-6-2020: Big data for buildings**

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<td>15 January 2020 17:00:00 Brussels time</td>
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**Specific Challenge:** European buildings are producing an increasing number of data on energy generation and consumption from various sources (e.g. smart meters, building management systems). Collecting and making available reliable data on buildings is a key challenge for the European Union. Enabling big data for buildings is key to achieving the EU targets. More and better data can lead to enhanced consumer information, contribute to an effective management of energy grids and support the creation of innovative energy services, new business models and financing schemes for distributed clean energy. Data is also a key enabler for reliable and effective policy impact assessments. The collection and analysis of building data, through data analytics tools, will produce statistics, business intelligence and predictive models that will enable reliable and effective policymaking.

**Scope:** Actions should focus on developing and demonstrating large-scale pilot test-beds for big data application in buildings.
More specifically actions should:

- define a reference architecture for buildings data; and
- develop and pilot an open, cloud-based data analytics toolbox.

The reference architecture should ensure compatibility with existing dataset formats across Europe, allow integration with legacy architectures, encourage replication and scale-up and be compliant with applicable EU standards (e.g. privacy, security, intellectual property). The data architecture should be modular in order to accommodate data from various sources including dynamic data from Smart Meters, Sensors and other IoT devices, Building Management Systems (BMS), energy market prices, weather data, currency exchange rates, as well as static data from existing databases such as consumer consumption data, Energy Performance Certificates (EPC) repositories and Building Stock Observatory.

Proposers should perform an extensive review of existing datasets across EU and take into account ongoing initiatives such as:

- EC Directives and initiatives (e.g. EPBD, EED, Ecodesign, INSPIRE, Digital Single Market);
- Reports and studies commissioned by EC on relevant topics (e.g. EU Building Stock observatory, Data Exchange Study);
- Existing frameworks and architectures (e.g. Level(s), SAREF, BIM, legacy formats).

The data analytics toolbox should be able to process big and diverse sets of data and perform Statistical Analysis, Data Visualisation, Business Intelligence (BI) and Predictive Modelling. The tools used should enable the integration of state of the art data science technologies like Statistics, Artificial Intelligence (AI), Machine Learning (ML) and Deep Learning (DL).

The data analytics toolbox should support third party development of a wide range of services and business models with the objective:

- to monitor and improve the energy performance of buildings;
- to facilitate the design and development of building infrastructure (e.g. district heating and cooling networks);
- to support policy making and policy impact assessment; and
- to de-risk investments in energy efficiency (e.g. by reliably predicting and monitoring energy savings).

The toolbox should foresee communication protocols to be able to pull data from and push data to existing datasets (e.g. the EU building stock observatory) in an automated way without manual intervention (e.g. using APIs). The toolbox should be built on state-of-the-art technologies and be hosted at a well-known, stable, secure and scalable cloud service provider (IaaS/SaaS/PaaS).

Proposed actions should demonstrate that they have access to existing large-scale real datasets and should engage as many as necessary of the following actors: national and local governments, network operators, suppliers, ESCO’s, building managers & facilitators, the construction & renovation sector and software developers with proven experience in data collection and data analysis. Projects are expected to collaborate with EU-funded projects on big data as well as the contractor in charge of Maintenance and Update of the EU Building Stock Observatory. **Proposers are expected to implement large-scale communication and dissemination campaigns in order to engage public authorities and the market actors.**
Projects are required to follow the H2020 guidance on ethics and data protection, taking into account digital security, privacy and data protection requirements including the compliance with relevant directives/regulations (e.g. NIS, eIDAS, GDPR) and relevant National Legislation.

The Commission considers that proposals requesting a contribution from the EU of between 3.5 and 4 million EUR would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

This topic contributes to the roadmap of the Energy-efficient Buildings (EeB) cPPP.

**Expected Impact:** Proposals are expected to demonstrate the impacts listed below, using quantified indicators and targets wherever possible:

- Significant and measureable contribution to standardisation of European buildings data;
- Demonstrated interoperability with data hubs at national or supranational level;
- Creation of new data-driven business models and opportunities and innovative energy services based on the access and process of valuable datasets;
- Better availability of big data and big data analysis facilities for real-life scale research, simulation and policy-making;
- Tangible engagement of key stakeholders in building the database and contributing with real data;
- A growing up-take of innovative data gathering and processing methods in the monitoring and verification of energy savings;
- Effective integration of relevant digital technologies in the buildings sector, resulting in integrated value chains and efficient business processes of the participating organizations;
- Strengthened links with the relevant programmes and initiatives aiming at building data collection and storage, supported by regional, national and European policies and funds;
- Emergence of sustainable ecosystems around big data platforms.

**Type of Action:** Innovation action

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

**LC-SC3-B4E-7-2020: European building stock data 4.0**

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**Specific Challenge:** There is a lack of quality data on the building stock across EU Member States and regions, in particular (but not only) on building energy. Reliable and comprehensive data is needed to enable an accurate understanding of the European building stock’s trends and drivers. This particularly applies to energy-efficiency policies and
related measures (e.g. market support mechanisms), which will be more effective if they are tailored based on an evidence-based, data-enabled, assessment of the building stock. For example, the revised Energy Performance of Buildings Directive (EPBD) calls for benchmarking of buildings through Building Automation and Control System. This approach would require extensive sharing of information between buildings. Data information on buildings may also be of use to building users and to the industry developing products and solutions. They may also help to adapt principles of a circular economy in the construction sector. The challenge is to establish and implement an ambitious vision for the future of data collection on buildings in Europe, enabled by a large and lasting community of data providers and stakeholders across Europe, and promoting cutting-edge technologies for data collection and processing.

**Scope:** Proposals should involve relevant stakeholders (national, regional and local authorities, property management companies, technology providers and stakeholder associations from relevant sectors: construction, facility management, real estate) to stimulate and enable a comprehensive and long-lasting community committed to improve, standardise and strengthen data collection on building stocks across the Europe, bringing together potential data providers and, building on technology innovation that can support wide-scale data collection and processing. Such data is useful for different purposes: for policy monitoring and development of new policies (at any level), to provide information to users or as a tool for the industry to develop new products and solutions.

To this end, proposals should develop strategies to encourage/support collection of data on buildings and convergence of data collection practices, within the community and beyond. This concerns but is not limited to the scope of data collection (which data are collected), the form of data (e.g. formatting) and the role that different actors can play in collecting and providing data (local authorities, private landlords, citizens, etc.). Proposals should also support/promote wherever possible wider availability of data (open access to data). Proposals should ensure that the scope of data collection includes, but is not limited to, data on buildings energy performance and related building characteristics (e.g. type and characteristics of building systems, type of insulation and glazing, etc.).

Projects are required to follow the H2020 guidance on ethics and data protection, taking into account digital security, privacy and data protection requirements including the compliance with relevant directives/regulations (e.g. NIS, eIDAS, GDPR) and relevant National Legislation.

Proposals may use the "Building Stock Observatory" as an example and reference of data collection, monitoring and evaluation of the building stock. Proposals could also clarify how they would support and link to the “Building Stock Observatory” and other relevant initiatives, emphasizing how they could contribute to expanding and strengthening the data feeding of the observatory.

Proposals should also develop and disseminate a vision and roadmap for a more advanced “big data” approach to buildings data collection in Europe (“European building stock data 4.0”). The aim is to propose a roadmap towards a more dynamic and automated collection of data on buildings, eventually leading to a “live” picture of the building stock. In developing and disseminating this vision, proposals will make connections with other relevant initiatives, in particular actions aiming at developing innovative big data applications in buildings. Due to the existence of several initiatives in this area, coordination between actions should be a key element for successful proposals. In particular, proposals should
liaise and coordinate with related initiatives supported under LC-SC3-B4E-6-2020 (‘Big data for buildings’) and LC-SC3-B4E-4-2020 (‘Next-generation of Energy Performance Assessment and Certification’), also providing support to communication and dissemination activities.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1.5 and 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:** Proposals are expected to demonstrate the impacts listed below, using quantified indicators and targets wherever possible:

- Building a large community for buildings data collection in the EU, ensuring tangible and long-lasting engagement of key stakeholders across all MSs and Associated Countries;
- Increasing/extending/strengthening data sources for buildings data collection in the Europe;
- Improving data feeding to the building stock observatory;
- Increased convergence/standardisation towards high-quality and reliable data collection practices;
- Increased data use by researchers and the general public;
- Simplified data access and sharing;
- Convincing vision and roadmap towards innovative big data approaches for the collection of buildings data in the Europe;
- Coordination with, and support for the communication and dissemination activities of related innovation actions;
- Strengthened links with programmes and initiatives, supported by regional, national and European policies and funds.

**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.*

**LC-SC3-B4E-9-2020: Support to the coordination of European smart buildings innovation community**

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**Specific Challenge:** The revised Energy Performance of Buildings Directive (EPBD) encourages the use of ICT and smart technologies to ensure that buildings operate efficiently. To this aim, the Directive further promotes smart building technologies and in particular requires the establishment of a Smart Readiness Indicator (SRI) for buildings. The SRI will allow for rating the smart readiness of buildings, i.e. their ability to adapt their operation to the needs of the occupant, to optimise energy efficiency and overall performance, and to adapt their operation in reaction to signals from the grid. The SRI will be further developed in
consultation with member states and stakeholders, with a view to eventually ensure a broad uptake of a robust SRI reflecting the state of the art in the field of smart buildings.

Since 2014, the EU has been supporting at least 64 projects relevant to this new definition of smart buildings, providing near to EUR 450 million funding. This support has been spread across 35 funding topics and 29 calls for proposals, mostly Horizon 2020 Innovation Actions. Similarly, the cross-cutting issue of building smartness is often addressed as a fringe issue in media, conferences or businesses specialised in energy, IT or buildings. Despite this fragmentation, most challenges faced by smart buildings are common, such as engaging building occupants, connecting and managing various devices and systems, achieving optimal building operation, or integrating buildings to energy markets.

Scope: The proposals should focus on facilitating the flow and exchange of information between EU-funded projects in the field of smart buildings and the related business, policy and media, e.g.:

- Map out the European smart buildings innovation community, e.g. main innovators, lessons learned, success stories and potential market developments.
- Identify the main initiatives, media and events in the field of smart buildings across the EU and coordinate the European smart buildings innovation community in their communication, contribution and participation.
- Encourage and support the contribution of the European smart buildings innovation community to the promotion, experimentation and roll-out of the SRI in the EU, and to other relevant policy initiatives.
- Suggest priorities for EU support to research, innovation and market uptake in the field of smart buildings from the point of view of potential applicants and target markets.

Proposals should not necessarily aim at the largest possible census of the smart buildings community or to seek participation in every possible events or initiatives, but rather focus on efficiency in breaking silos and bridging the gaps between innovation, markets and policy (e.g. sharing case studies, communicating success stories, seizing relevant contribution opportunities, etc.).

The proposed consortium may involve representatives of the target groups relevant to the EU smart buildings innovation community, e.g. specialised media, business or consumer organisation, policy or technological initiatives civil society organisations, etc.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 and 1.5 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: Proposals are expected to demonstrate, depending on the scope addressed, the impacts listed below:

- Draw up an overview of the main stakeholders of the EU smart buildings innovation community updated annually;
- Improve the exchange of information between R&I and market uptake projects via at least 6 workshops;
• Increase visibility of innovation in the field of smart buildings by coordinating the participation in at least 6 major events relevant to smart buildings;
• Coordinate contributions of the EU smart buildings innovation community to the SRI promotion, experimentation and implementation, and to other policy or technological initiatives.

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.

LC-SC3-B4E-10-2020: Self-assessment and self-optimisation of buildings and appliances for a better energy performance

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Specific Challenge: While significant progress has been made, energy efficiency in the Europe is a battle that remains to be won. Buildings, as they represent the biggest energy consumer in the Europe, have a prominent role to play. New buildings consume today much less than they used to. This is due to ambitious policies: the Energy Performance of Buildings Directive (EPBD) has set a demanding framework for energy performance of buildings, which has fostered a rapid evolution of technologies and practices towards greater levels of energy efficiency. This also applies to systems and products that are used in buildings, such as lighting, space and water heaters, domestic appliances and ICT equipment; EU-Regulations on energy-related products under the Ecodesign and Energy Labelling policies are estimated to deliver energy savings of around 175 Mtoe per year in primary energy by 2020, more than the annual primary energy consumption of Italy. Improving skills of installers and service providers can deliver further savings.

Energy performance of buildings generally does not reflect consumption from appliances that are not part of technical building systems, such as heating, ventilation and cooling systems. At a time when the designed energy performance of buildings and appliances is improving dramatically, it would be worth gaining an accurate vision and understanding of their actual, real-life energy performance. Access to information on the actual energy performance and energy consumption is essential to help users making informed choices, both in terms of investment and in terms of usage and maintenance. In this respect, a remaining challenge is to advance the way actual energy performance and consumption is assessed and measured. For buildings, the energy performance is mainly calculated at design stage, based on the characteristics of the buildings’ envelope, components and systems. Real consumption can be taken into account but to a certain degree that remains limited. For appliances, energy consumption is tested and monitored as they are placed on the market or put into service under conditions that aim to reflect real life usage. This approach is reliable but still, in-use performance may vary e.g. depending on the way buildings and products are commissioned, installed, set up and utilised, accordingly. For certain products, a specific challenge comes with the software or firmware updates of - usually connected - devices,
which often change the original settings with considerable impact on the energy consumption (e.g. disabling of standby-modes). In addition, performance may evolve, i.e. decrease, over the lifetime, which is not reflected by the performance as designed or placed on the market. Addressing therefore the self-assessment of products actual energy performance to achieve or maintain better energy efficiency at appliance level and by extension a better energy management in the building is important.

**Scope:** Proposals should develop and demonstrate cost-effective technological solutions for the self-assessment of actual energy performance of buildings and the products which use energy in buildings. Such solutions would rely on collection of real-time data from the products installed and used in the building (within a system or stand-alone) and aggregation of this data at the building level. The aim is to follow, over time, and with the best possible granularity, the actual consumption and the evolution of energy performance of the building, individual systems and individual appliances (including those that are integrated within systems).

The solution should ensure, to a certain extent, the energy-optimisation functions executed at building, system or appliances level based on the real time and historical data of energy consumption, which can be crossed with other data as appropriate.

Proposals should demonstrate how, thanks to existing smart capabilities of appliances, systems and sensors, it would be possible for a building to self-assess its energy performance, address, to a certain extent, its underperformance (lower than the average or lower than as designed energy performance) and provide information on the level of performance and related evolution – at building-level (aggregated view), but also at system / appliance level (disaggregated view).

In the calculation of energy performance, at building and product level, proposals should ensure full knowledge of and compliance with the requirements from the EPBD (Annex I on the calculation of energy performance), related CEN standards, with energy consumption measurement approaches and related processes involving smart functionalities (Ecodesign preparatory studies on smart appliances and on Building Automation and Control Systems (BACS)). They should also take into account the technological and regulatory state-of-the-art for (smart) metering and billing. For products regulated under Ecodesign and Energy Labelling, the measured and reported energy consumption should be benchmarked against the provisions of the relevant regulations and used to create a basis for future provisions. Information additional to energy consumption where applicable (i.e. load, programme) should be recorded in order to look into providing input on usage patterns and energy savings potential at appliance level. In this respect, proposals could include activities (e.g. training) aiming at improving skills of installers and service providers, when putting products and systems into service.

Proposals should make the best use of available interoperability solutions and should seek to support the promotion of European standards and other relevant European initiatives relevant for smart buildings, smart homes and smart services (semantics, e.g. SAREF, data models, data layers, protocols, software building blocks, APIs, middleware, solutions for smart services, standards, relevant industrial consortia or technology initiatives, etc.).

Proposals should demonstrate that the solution proposed would be applicable, based on available technology, across the European building stock and products groups available on the single market and, to this end will include a set of pilots where the solution will be deployed, tested, and related impacts assessed. Pilots should involve several types of
products and technical building systems with longer lifecycles (e.g. boilers and water heaters, radiators, ventilation, lighting and BACS controlling one or more of these functions etc.) and with shorter ones (domestic appliances, ICT equipment, multimedia and consumer electronics etc.), testing several types of operating modes and user settings. Recharging points for electric vehicles and other forms of energy storage should also be incorporated in the pilots. Pilots should demonstrate self-assessment and self-reporting of energy consumption at appliance level.

The proposed solutions should not adversely affect the original functionalities, product quality, lifetime, as well as warranties of the appliances. They should be cost-effective, user-friendly and not require significant development, installation or maintenance work.

Besides the pilot demonstrations, proposals are expected to include clear business model development and a clear path to finance and deployment of the proposed solution. These business models and exploitation strategies should target the broad uptake of such solutions across the Europe and clarify how, these solutions could possibly support the development of related energy service businesses, in particular ESCO’s.

As part of exploitation activities, proposals should also investigate how such self-assessment solutions could support a forward-looking evolution of energy performance assessment practices, both for buildings (in relation to the EPBD and therein, in particular in relation to Energy Performance Certificates) and for energy-related products (in relation to testing products energy performance under Ecodesign and Energy Labelling Regulations).

Projects are required to follow the H2020 guidance on ethics and data protection, taking into account digital security, privacy and data protection requirements including the compliance with relevant directives/regulations (e.g. NIS, eIDAS, GDPR) and relevant National Legislation.

In addition, consortia should clarify how the proposed solution could support a cost-effective, performance- and data- based assessment of the smart readiness of a building (i.e. the calculation of the 'smart readiness indicator', within the meaning of the EPBD). In relation to this, proposals will also investigate how the solution proposed could lead to the self-assessment of buildings’ smart readiness capabilities beyond solely energy performance, in particular the capability of a building and its appliances to ensure the satisfaction of building users’ needs and the capability of a building to adapt operations based on signals from its environment, in particular the grid (i.e. energy flexibility).

The proposals should involve appliance suppliers (e.g. heating, cooling, domestic appliances, and ICT equipment), installers and building energy management solution suppliers. Partners from the energy sectors, which can have an interest in the accurate assessment of energy performance and consumption, can also be relevant (e.g. aggregators and/or suppliers and/or ESCO’s).

The activities are expected to be implemented at TRL 6-8 (please see part G of the General Annexes).

The Commission considers the proposals requesting a contribution from the EU of between 3 to 6 million would allow this specific challenge to be addressed appropriately. Nonetheless this does not preclude submission and selection of proposals requesting other amounts.

This topic contributes to the roadmap of the Energy-efficient Buildings (EeB) PPP.

Expected Impact: Proposals are expected to demonstrate the impacts listed below using quantified indicators and targets wherever possible:

- Primary Energy savings triggered by the project (in GWh/year);
- Investments in sustainable energy triggered by the project (in million Euro);
• Assessing the energy performance and energy consumption of buildings and products used therein with a greater accuracy;
• Contribution to forward-looking calculation and measurement approaches under the EPBD (regulatory calculation of building energy performance, energy performance certification, and smart readiness indicator) and EU product efficiency legislation;
• Investments in smart technologies triggered;
• Reduction in energy consumption and costs, exceeding the additional energy consumption from ICT equipment and its related cost.

Additional positive effects can be quantified and reported when relevant and wherever possible:
• Reduction of the greenhouse gas emissions (in tCO2-eq/year) and/or air pollutants (in kg/year) triggered by the project.

Type of Action: Innovation action

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

LC-SC3-RES-34-2020: Demonstration of innovative and sustainable hydropower solutions targeting unexplored small-scale hydropower potential in Central Asia

SwafS Key Word(s) | Public Engagement, Responsible Research and Innovation (RRI)
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Deadline | 10 September 2020 17:00:00 Brussels time
Topic Information | Link

Specific Challenge: The challenge is to demonstrate innovative solutions targeting unexploited small-scale hydropower potential in Central Asia that will contribute to solve the particular cross-border water and energy management challenges in the region. Therefore, the hydropower technological solutions will need to be socio-economically and environmentally sustainable and embedded in a forward-looking cross-border Water/Food/Energy/Climate nexus concept for this region.

Scope: Projects will demonstrate innovative hydropower equipment exploiting unexplored small-scale hydropower potential in Central Asia up to 10 MW installed capacity by means of sustainable and cost-effective small-scale hydropower solutions. The demonstration will provide solutions for realising innovative and sustainable hydropower, based on synergies between innovative European hydropower technology, research and industry partners, and the Central Asian hydropower sector. Therefore, the demonstration activities shall take place in Central Asia (Kazakhstan, the Kyrgyz Republic, Tajikistan, Turkmenistan or Uzbekistan), with participation of local partners.

The project should also fulfil the highest standard in terms of socio-economic and environmental sustainability and impact, and engagement of local civil society. It should also demonstrate how it will contribute positively to the regional cross-border Water/Food/Energy/Climate nexus and refer to embedded sustainable hydropower auxiliary services.
Proposals are expected to bring the technology from TRL 6-7 to 7-8 (please see part G of the General Annexes).

The Commission considers that proposals requesting a contribution from the EU of between EUR 7 to 10 million would allow this challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

**Expected Impact:** The action is expected to support the competitiveness of the European hydropower technology sector as a responsible actor in global markets in the long-term, with a strong focus on overall sustainability of the provided hydropower solutions within the Water/Food/Energy/Climate nexus in Central Asia. The expected outcomes will strengthen the worldwide leadership of the European hydropower industry in providing innovative and sustainable hydropower solutions and will support international cooperation with developing countries. Expected are outcomes which are in line with UN sustainable development goals.

**Type of Action:** Innovation action

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


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**Specific Challenge:** Since the adoption of RES Directive in 2009, most Member States have experienced significant growth in renewable energy production and consumption, and both the EU and a large majority of Member States are on track towards the 2020 RES targets. At the same time the cost of energy from renewable energy sources has decreased significantly and the performance and market penetration of these sources has increased. Nevertheless, there is still a lot of market potential to be exploited. This potential is recognised in the "Clean Energy for all Europeans" package adopted at the end of 2016, which sets renewable energy targets for 2030 and introduces modifications in the energy market design, while empowering individuals or communities to participate actively to the energy system transformation. Furthermore, in June 2018 member states agreed to set an overall EU renewable energy target of 32% by 2030. Challenges exist for renewable energy to realise its full potential in all sectors and accelerate the clean energy transition, playing a crucial role in leading to an increased share of renewable energy consumed in the EU and to a more active role for the consumers.

The introduction and deployment of renewable energy at large scale requires overcoming a number of barriers. These cover issues such as consumer acceptance, legal and financial challenges related to the introduction of novel solutions into a technical and business environment with incumbent established solutions in place, necessity of making renewable energy solutions compliant with the new legislations, facilitation of legislative and regulatory aspects limiting innovative energy solutions.
implementation at the grid levels and also at the community or citizen level. Improving existing tools for better assessing the environmental, economic and social impact of renewable energy solutions is challenging due to the breadth and scope of the different renewable technologies. The challenges are also related to creating a renewable energy sector fit for massive deployment in the market, which means ensuring that complete value chains for a broad range of renewable energy technologies are in place, not only covering raw materials (such as e.g. bioenergy feedstock) logistics but also components availability and operational reliability; and ensuring that renewables are fit to the market and capable to provide additional services to the grid. The energy markets outside the EU must not be forgotten, as they represent the most significant long term opportunity growth of the sector, but the penetration of these markets is a challenge in itself too.

Scope: The proposal will develop solution(s) addressing one or more of the identified challenge(s), for the entire renewable energy sector or focusing on a specific energy market, such as electricity, heating, cooling or renewable fuels. The proposed solution can be developed to address a local challenge but should have wide potential for reapplication. The solution must have a long term viability and not be limited to an ad-hoc fix. The methodologies applied may be inspired by successful approaches already tested in other fields or contexts.

For all actions, the consortia have to involve and/or engage relevant stakeholders and market actors who are committed to adopting/implementing the results. The complexity of these challenges and of the related market uptake barriers may call for multi-disciplinary approaches, which should include contributions from the social sciences and humanities. Where relevant, regional specificities, socio-economic, gender-related, spatial and environmental aspects will be considered from a life-cycle perspective.

Where relevant, proposals are expected to also assess the legal, institutional and political frameworks at local, national and European level and examine how, why and under what conditions these (could) act as a barrier or an enabler.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 to 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: It is expected that the solution proposed will facilitate the wider uptake of renewable energy generation in the energy and industrial sectors leading to an increase share of renewable energy in the final energy consumption by 2030. The solution will contribute to substantial and measurable reductions in the project development timings and efforts, whilst fully addressing the needs for environmental impact assessments and public engagement. It will also contribute to provide a basis for the development of more informed policy, market support and financial frameworks, notably at national, regional and local level, leading to more cost effective support schemes and lower financing costs for RES facilities.

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.

LC-SC3-EC-1-2018-2019-2020: The role of consumers in changing the market through informed decision and collective actions

SwafS Key Word(s) | Ethics, Responsible Research and Innovation (RRI)
---|---
Deadline | 10 September 2020 17:00:00 Brussels time
Topic Information | Link

Specific Challenge: A precondition for active demand is for consumers to be aware of their own potential to permanently or temporarily reduce energy consumption; and moreover, for them to know how to offer this potential to the market and what it would represent in terms of monetary value by bringing benefits to the energy system.

Different forms of collective action have the potential to assist consumers in forming critical mass and to facilitate increased uptake of energy efficiency & active demand solutions and services. Although collective actions on energy efficiency have emerged in recent years, a lack of awareness on the potential benefits of such actions, together with regulatory barriers, continues to hamper their full development and uptake. Finally, important challenges involve installed appliances (such as boilers for space and/or water heating) of which a big share is inefficient and fossil-fuel based, resulting in increased fuel consumption and fuel costs for households. Informing consumers of the potential energy savings and their monetization, as well as other benefits such as increased comfort and improved air quality, can result in increased motivation for replacing inefficient appliances, thereby permanently reducing consumption.

Scope:

2019 and 2020:

The proposed action should set up and/or support energy communities (consumer cooperatives, consumer collective purchase groups, and/or other consumer driven collective actions) to increase energy efficiency and/or optimise energy management to integrate a higher share of renewable energy (generated locally or provided from the grid) within the community by, for example, combining collective solutions to distributed generation, distributed storage, and/or demand-response aggregation. The focus of the proposed action should be on households, however, this does not preclude the complementary involvement of non-residential buildings.

The proposed action should cover the following points:

- Identify and address regulatory barriers and contractual conditions with utilities, suppliers, grid operators, technology providers etc. for cooperative actions, possibly linking activities with structural solutions involving public authorities;
• Demonstrate that collectively organised energy-related actions are financially viable and attractive to the consumer-members of the energy community.

In addition, the proposed action could cover the following points, as relevant:

• Identify and implement solutions to address split incentives (e.g. allowing tenants to set up/join the consumer driven collective action);
• **Demonstrate collective actions of energy consumers based** on the solutions and business approaches using digital tools and technologies (such as digital platforms or blockchain transactions). If the proposed action includes smart home/IoT solutions, it should link to the developments under the call DT-ICT-10-2018: *Interoperable and smart homes and grids*.

**Relevant for the three years:**

The proposed actions should address the risk of "rebound effects" and propose measures to counteract them, where relevant. All relevant stakeholders necessary for the successful implementation of the action should be involved and relevant consumer organisations, in particular, should be either directly involved or their support demonstrated in the proposal. Proposed actions should also take issues of consumer data ownership and data privacy into account, where relevant. The proposed actions are invited to build on experiences and lessons learned in other relevant projects and programmes.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 and 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:** Proposals are expected to demonstrate, depending on the scope addressed, the impacts listed below using quantified indicators and targets, wherever possible:

• Primary energy savings triggered by the project (in GWh/year);
• Investments in sustainable energy triggered by the project (in million Euro);
• Contribution to reducing regulatory barriers and improving contractual conditions;
• Increase domestic uptake of energy efficient products and services;
• Involvement of at least 5,000 consumers per million Euro of EU funding.

Additional positive effects can be quantified and reported when relevant and wherever possible:
• Reduction of greenhouse gases emissions (in tCO2-eq/year) and/or air pollutants (in kg/year) triggered by the project.

**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.*
#### LC-SC3-EC-2-2018-2019-2020: Mitigating household energy poverty

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**Specific Challenge:** European households continue to spend an increasing share of income on energy, leading to higher rates of energy poverty and negatively affecting living conditions and health. Recent estimates suggest that more than 50 million Europeans are affected by energy poverty. Although roots of this phenomenon lie mainly in low incomes and poor thermal efficiency of buildings, energy efficiency measures at the household level and increased use of renewable energy are key tools in addressing energy poverty and can bring energy savings, leading to lower fuel costs and improved living conditions. The issue is in part exacerbated by a lack of sufficient knowledge on how to identify energy poor households.

In this context, the role of local and national authorities, related networks and initiatives, and availability of support schemes are important to ensure the sustainability and larger scale uptake of the measures.

Energy Efficiency Obligation Schemes can also be used to promote social aims, such as tackling energy poverty. The obligated parties (utilities) have potentially at their disposal the necessary data and means to identify energy poverty among their customers and effectively address it by fulfilling in this way the energy efficiency obligation. Building the capacity of the obligated parties is needed in order to spread such schemes across the EU.

**Scope:** Actions should contribute to actively alleviating energy poverty and developing a better understanding of the types and needs of energy poor households and how to identify them, taking into account gender differences where relevant, building on any existing initiatives such as the European Energy Poverty Observatory.

The proposed action should cover one or more of the following:

- Facilitate behaviour change and implementation of low-cost energy efficiency measures tailored for energy poor households (e.g. provision of information and advice, energy efficiency services such as draught proofing or optimisation of existing building technology systems, as well as energy efficiency devices & kits such as low-energy lighting);
- Support the set-up of financial and non-financial support schemes for energy efficiency and/or small scale renewable energy investments for energy poor households. These actions should be embedded in, and add value to, structural frameworks and activities involving local, regional, and national authorities, and/or networks such as the Covenant of Mayors;
- Develop, test and disseminate innovative schemes for energy efficiency/RES investments established by utilities or other obligated parties under Article 7.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 and 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.
The proposed actions are invited to build on experiences and lessons learned in other relevant projects and programmes.

**Expected Impact:** Proposals are expected to demonstrate, depending on the scope addressed, the impacts listed below using quantified indicators and targets, wherever possible:

- Primary energy savings triggered by the project (in GWh/year);
- Investments in sustainable energy triggered by the project (in million Euro);
- Contributions to policy development and to best practice development on energy poverty;
- Support schemes established for energy efficiency and/or small-scale renewable energy investments and to be sustained beyond the period of EU-support.
- Involvement of at least 5,000 consumers per million Euro of EU funding.

Additional positive effects can be quantified and reported when relevant and wherever possible:

- Reduction of greenhouse gases emissions (in tCO2-eq/year) and/or air pollutants (in kg/year) triggered by the project.

**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.*

**LC-SC3-EC-3-2020: Consumer engagement and demand response**

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**Specific Challenge:** To put consumers / prosumers at the heart of the energy market and to develop and test new cost-effective solutions for consumers based on the next generation of energy services for consumers that are beneficial to the integration of RES into an efficient operation of the grid and of the power system, that will allow to better predict and incentivise consumer behaviour. **Engaging consumers and prosumers in demand-response mechanisms and other energy services** - based on dynamic prices as well as on incentives from grid operators to adjust energy consumption or production to help maintain frequency stability, manage congestion or address other grids constraints - **has the potential to bring benefits to consumers and to the energy system.**

Decentralised (renewable) energy production and digitalisation allow for new ways for consumers to engage in the energy transition, for example through energy cooperatives, peer-to-peer trading and citizen energy communities. Building and home automation allows for the integration of services to consumers and the creation of value by combining data and services across different sectors for example combining energy services (electricity, heat) with mobility (electric cars), health (assisted living).
Scope: The proposals will develop and test novel solutions and tools for demand response and energy services, using real consumption data and feedback from the testing of services with the objective to improve predictability of consumption and consumer behaviour (aiming to create a digital twin of the consumer). The main focus will be on households, but other types of consumers (residential, industrial, commercial and tertiary, including prosumers who are self-consuming part of the energy they produce) may be included. Proposals will demonstrate services that bring a fair share of benefits to consumers and to the energy system, in particular the electricity grid. The proposals should take into account the existing EU framework and the proposed measures under the Clean Energy for all Europeans Package, including the relevant measures on demand response, active customers, energy communities and dynamic price contracts.

Proposals can target one or multiple types of loads (e.g. appliances, electric vehicles, power to heat / cool, etc.) as well as (small-scale) production (e.g. PV), include energy storage and one or several methods of aggregation (e.g. citizen energy communities). Preferably they should rely on advanced automation, advanced ICT tools and approaches (e.g. IoT, Big Data, AI, blockchain, etc.), communication protocols and interoperability.

Proposals are encouraged to include energy vectors other than just electricity (e.g. heating, cooling, water, wastes, etc.), and are encouraged to include other services than energy (e.g. mobility, health, etc.).

Proposals should not only bring a perspective from the grid and the power system on consumers but also a perspective from consumers on the grid and the power system. For this purpose, social science and humanities-related work will be closely associated with the development of technological solutions from the beginning of the project (e.g. co-creation process involving both technology/service providers and consumers) and not as an isolated task/work-package.

Privacy, consumer and personal data protection and cybersecurity should be addressed by the proposed solutions.

Proposals will demonstrate how they will use interoperable digital communication solutions, make use of existing standards, study what is the information that shall be exchanged and contribute to open platforms and market places that can be integrated with other services based on platforms.

Services, customer information, engagement strategies and contracts should be designed, tested and conclusions should be drawn to improve predictability of consumption and consumer behaviour, based on the different types of consumers (e.g. segmentation along different categories, e.g. social category, age, technology literacy, gender, etc.) on the considered location and climatic conditions and on the type and magnitude of incentives, putting the citizen at the centre of the proposed approach. The participation of local energy communities, energy cooperatives, aggregators and local actors is encouraged. The participation of consumer associations in the project is an added value.
Proposals are expected to include clear business model development and a clear path to finance and deployment as a dedicated task, which confirms delivery of affordable energy in no more than 5 years, as well as a clear strategy for managing cybersecurity. Key partners should have the capability and interest in making the developed solution a core part of their business/service model to their clients. Proposals are expected to demonstrate knowledge of the relevant EU’s policies on smart homes and buildings, interoperability, Internet of Things and platforms for data exchange.

Proposals should include tasks or a specific work-package on the analysis of obstacles to innovation under the current context but also under the future market design context and foresee the coordination on policy relevant issues and obstacle to innovation (e.g. regulatory framework, business models, data management, consumer engagement) with similar EU-funded projects through the BRIDGE initiative. An indicative budget share of at least 2% of the EU contribution is recommended for the research work associated with these issues.

Proposals should build upon the insights and results of projects that have already been selected in this field under Horizon 2020 (information can be found on the BRIGDE web site) and demonstrate their innovative character.

Projects will cooperate with at least one of the projects supported under the topic LC-SC3-ES-5-2018-2020 that approach the challenge more from a grid perspective. Therefore, proposals will foresee a work package for cooperation with other selected projects and earmark appropriate resources (indicatively 5-10% of the requested EU contribution) for coordination and communication efforts and research work associated with cross-cutting issues. Regarding data handling, data management and standardisation issues, proposers should comply with the requirements stated in the section ‘Common requirements’ of the introduction to the part on the Smart citizen-centred energy system.

TRL will range between 5 and 8 (see part G of the General Annexes). Proposers will indicate the estimates levels of TRL at the beginning and at the end of the project.

The Commission considers that proposals requesting a contribution from the EU of between EUR 4 to 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 supported projects are expected to contribute to the following impacts:

- Increased use of demand response across the European energy system;
- Increased number and types of consumers engaged in demand-response across Europe;
- Demonstrated and improved viability of innovative energy services, best practices and effective incentives that can be replicated at large scale;
- Increased uptake of services that combine energy efficiency with other energy services, technologies and non-energy benefits;
- Increased reliability of innovative energy services and accessibility to them Developed and demonstrated viable solutions for customers: best practices and effective incentives that can be replicated at large scale;
- Increased predictability of consumption patterns and consumer behaviour;
• Increased data protection and privacy for customers;
• Improved modelling of the flexibility levers from the new energy services;
• Increased share of energy or power that can be mobilised to provide flexibility to the grid and increase the hosting capacity for RES.

Proposals are invited to address at least 7 of the above impacts, substantiate them and include ad-hoc indicators to measure the progress against specific objectives of their choice that could be used to assess the progress during the project life. Indicators are expected to have clear and measurable targets.

**Type of Action**: Innovation action

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

**LC-SC3-EC-4-2020: Socio-economic research: non-energy impacts and behavioural insights on energy efficiency interventions**

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**Specific Challenge**: In the Energy Union Strategy, Energy Efficiency was recognised as a resource in its own right, which should be enabled to compete on equal terms with generation capacity and to have primary consideration across all policies. However, two additional aspects need to be taken into consideration in order to create effective future policy scenarios and allow for financial and political decision making, while prices of fossil fuels remain relatively low:

- the real value beyond the fuel's cost and the (energy and non-energy) impacts of energy efficiency;
- psychological and contextual features (such as consumers’ behavioural biases, superfluous complexity of alternative options or external barriers to energy efficiency) which can negatively impact the quality of consumers’ decision-making.

**Scope**: a) **Modelling multiple non-energy impacts**

Actions are required to explain the transition of energy efficiency from a "hidden fuel" to the "first fuel" and make the value of the externalities triggered by energy efficiency investments more visible across a variety of areas. The analysis should go beyond the traditional measures of reducing energy demand and greenhouse gas (GHG) emissions; it should include positive and negative externalities relating to other policies such as public health, air quality, impact on ecosystems, etc.

Actions should build upon the existing methodological frameworks and the work already developed in this field in order to:

- create econometric models and other instruments able to quantify and when possible monetise direct and indirect non-energy impacts (both positive and negative) of
energy efficiency investments, taking into account all possible challenges (e.g. rebound effect, double counting, etc.);

- provide a simplified and evidence-based tool which can help policy makers at local, regional, national and European level in defining optimised short-term cost-effective policies and measures as well as long-term strategies in the energy domain;

- disseminate the concept to households, businesses and financing institutions in order to increase awareness, information level, and investments in energy efficiency improvements.

b) Behavioural insights for energy efficiency interventions

Actions should test energy efficiency behavioural change interventions through field trials informed by behavioural science. These trials should be aimed at selecting effective approaches to deliver the largest impact and should be targeted to specific energy behaviours.

Research may involve a mix of methodologies including different qualitative and quantitative research methods (e.g. RCTs, A/B testing, before-and-after trials, observation, focus groups, surveys, exploitation of existing datasets, quasi-experiments, etc.).

Consortia should include, on the one hand, behavioural experts and, on the other, public authorities, DSOs and/or relevant civil society organizations (NGOs, associations, local energy communities, etc.) implementing energy efficiency related interventions.

Proposals should describe how the role and tasks of the various Consortia’s members will be coordinated. They should place emphasis on the European added-value of their outputs and the comparability of the results of different pilots in order to be relevant for European policy makers. The theoretical and empirical research chosen by the consortium should allow to draw conclusions regarding the best policy instruments (e.g. push and pull measures, price mechanisms, incentives, the leveraging on social norms, the provision of simplified real-time and possibly comparative information about one’s own consumption pattern, etc.), the relevant contextual aspects determining the efficiency of the intervention and, where possible, the long-term impacts of behaviourally informed policy interventions.

Proposals should build on relevant national and international projects and initiatives.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 and 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: Depending on the scope addressed, proposals are expected to identify the impacts listed below using quantified indicators and targets, wherever possible:

a. Support policies, at all governance levels, aiming to foster investments in Energy Efficiency improvements and best practice development (scope a and b);

b. Increased awareness among households, businesses and financing institutions (scope a and b);

c. Number of public officers, private actors and other stakeholders involved and reached out to, number of peer-reviewed articles produced, or references to impact assessments, strategy papers or other policy documents (scope a and b);
d. Increase awareness on multiple benefits among policy makers in other-than-energy policy departments e.g. using a simplified language in order to allow their inclusion in future policy developments and monitoring, impact assessments and policy evaluations (scope a);
e. Number of analysed scenarios, energy efficiency measures and of non-energy benefits (scope a);
f. Number of interventions designed using behavioural levers and relevant behavioural biases and elements identified (scope b);
g. Number of consumers adopting a more sustainable energy consumption behaviour (scope b);
h. Primary energy savings triggered by the project (in GWh/year – scope b);
i. Investments in sustainable energy triggered by the project (million Euro – scope b).

Additional positive effects can be quantified and reported when relevant and wherever possible:

j. Reduction of greenhouse gases emissions (in tCO2-eq/year) and/or air pollutants (in kg/year) triggered by the project (scope b).

**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-SC3-EC-5-2020: Supporting public authorities in driving the energy transition

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**Specific Challenge**: The delivery of the Energy Union targets requires the full engagement of the public sector at all governance levels.

Local and regional public authorities have a crucial role in setting ambitious energy efficiency strategies, for instance in the framework of the Covenant of Mayors for Climate & Energy and Smart Cities & Communities or the Clean Energy for EU islands initiative. The political commitment at local level should be enhanced and the focus should turn to implementation and effective monitoring of concrete energy efficiency solutions and actions, which can contribute to modernise and decarbonise the European economy. Synergies should be sought, whenever possible, with local and regional air quality plans and air pollution control programmes to reduce costs since these plans rely to a large extent on similar measures and actions.

Support should continue and be reinforced in building capacity of public authorities and empowering them to take up their role of energy transition leaders at regional and local level, by permanently improving their skills as public entrepreneurs and supporters of market transformation towards more efficient energy systems.

At national level, the Energy Efficiency Directive has triggered numerous positive developments in the Member States by setting targets to incentivise and enable investment in energy efficiency programmes across all sectors. However, Member States have yet to
fully implement the Directive and additional support in building capacity and know-how is needed.

**Scope**: a) *Support to local and regional public authorities*

The Commission considers it to be equally relevant to address one or more of the following bullet points, as appropriate:

- **Enhance decision-making processes of regional and local authorities, to deliver a higher quality, coherence and consistency of energy efficiency measures** - and accelerate reaching targets. Actions should foster horizontal and vertical integration of different governance levels, joint application of the energy efficiency measures across local and regional authorities, improved monitoring and verification schemes, and more efficient use of public spending. Proposals should demonstrate political commitment and lead to subsequent institutionalisation of the improved processes in support of the Energy Union Governance Regulation.

- **Support public authorities in the development of policy scenarios and transition roadmaps that clearly outline the path to the European long-term 2050 targets and inform the ongoing implementation of SEAPs/SECAPs or similar plans and the development of future plans/targets for 2030 and beyond.** Actions should link closely to the Covenant of Mayors initiative and the Energy Union Governance Regulation, where relevant.

- **Innovative ways to enable public engagement in the energy transition, developing interface capacities within public authorities to engage with civil society.**

- **Deliver innovative capacity-building programmes for cities and/or regions to step up their capacity to drive the sustainable energy transition in their respective territories.** Proposals should foster a sustained increase in the skill base of public authorities, adapted to their needs and challenges, and support the diffusion of the learning within participating organisations and beyond. The proposed actions should include a strategy to replicate results across Europe and a solid impact monitoring.

Proposals should build on existing initiatives such as the Covenant of Mayors, ManagEnergy or any other relevant initiative as appropriate.

b) *Supporting the delivery of the Energy Efficiency Directive*

Proposers should focus their proposed action on:

Actions assisting Member States to fulfil their obligations under the Energy Efficiency Directive (EED) and – where relevant to the implementation of the EED – under the Energy Union Governance Regulation. Proposals should support efficient implementation by taking into account existing effective practices and experiences from across Europe. Proposals may address, for example, the harmonisation of energy savings calculations under Article 3, the effective implementation of Article 7 including consistent monitoring and verification systems, higher efficiency of the generation under Article 14 and of transmission or distribution systems under Article 15 or an efficient development and continuous reporting of Integrated National Energy and Climate Plans.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 and 1.5 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:** Proposals are expected to demonstrate, depending on the scope addressed, the impacts listed below, using quantified indicators and targets wherever possible:

- Primary energy savings, renewable energy production and investments in sustainable energy triggered in the territory of participating parties by the project (respectively in GWh/year and in million Euro);
- Number of institutionalised collaborations on the energy transition between public authorities;
- Numbers of stakeholders active in delivering the energy transition;
- Number of public authorities and public officers with improved capacity/skills in delivering the energy transition;
- Number of policies influenced through the action;
- Number of Member States with improved implementation of the EED and linked Energy Union Governance Regulation, clearly attributable to project activities.

**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.*

**LC-SC3-ES-3-2018-2020: Integrated local energy systems (Energy islands)**

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**Specific Challenge:** The fast growth of energy production from renewable energy sources offers new and economically attractive opportunities for decarbonising local energy systems (e.g. isolated villages, small cities, urban districts, rural areas with weak or non-existing grid connections). It is also a technological and financial challenge for the electricity network to integrate more renewables, but it is also an opportunity to optimise the electricity system operation in synergy with other energy carriers/vectors to increase the hosting capacity for renewables, not just for electricity but also for heating/cooling, transport and/or industry in a sector coupling approach. Novel approaches to optimize network architecture, planning and development based on the opportunities offered by integrated local energy systems and enabled by digitalisation and power electronics can contribute to addressing the challenge, as can storage of electricity in all energy vectors (e.g. electricity, heating, cooling, water, wastes, etc.), including possibilities offered by batteries and electric vehicles. Integrated local energy systems can be used to create economically attractive conditions to boost local energy sources and activate local demand-response. Innovative approaches, for example based on Renewable Energy Communities, in line with the recently adopted Renewable Energy Directive (EU) 2018/2001 can result in attractive business cases for local investments in smart integrated energy systems with weakly or non-existing grid connections.
At the same time, decarbonisation can go hand-in-hand with the improvement of local air quality and citizens’ engagement.

**Scope:** Proposals will develop and demonstrate solutions which analyse and combine, in a well delimited system, all the energy vectors that are present and interconnect them, where appropriate, to optimise their joint operation that is demonstrated by an increased share of renewables in and higher energy efficiency of the local energy system. Proposals should present a preliminary analysis of the local case as part of the content of the proposal and propose to develop solutions and tools for the optimisation of the local energy network, that also have a high replication potential across Europe. Local consumers, small to medium industrial production facilities and/or commercial buildings should be involved in the projects from the start, preferably by creating energy renewable energy communities.

TRL will range between 5 and 8 (see part G of the General Annexes). Proposals will indicate the estimated levels of TRL at the beginning and at the end of the project. Proposals will include a task on the analysis and communication of obstacles to innovation and foresee the coordination on policy relevant issues (e.g. regulatory framework, business models, data management, consumer engagement) with similar EU-funded projects through the BRIDGE initiative and, if relevant to the project, the Clean Energy for EU Islands initiative. An indicative budget share of at least 2% of the EU contribution is recommended for the research work associated with these issues and an additional 2% of the EU contribution for the coordination effort.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 to 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 supported projects are expected to contribute to all the following impacts:

- validate solutions for decarbonisation of the local energy system while ensuring a positive impact on the wider energy infrastructure, on the local economy and local social aspects, and local air quality;
- **enhance the involvement of local energy consumers and producers, preferably by creating energy communities** in the development and the operation of local energy systems and test new business models;
- validate approaches, strategies and tools to safely and securely operate an integrated local energy system across energy vectors (electricity, heating, cooling, water, wastes, etc.) so that it is able to integrate higher shares of renewables (than it would in case of separate operation of infrastructures);
- **benchmark technical solutions and business models that can be replicated in many local regions and that are acceptable by local citizens.**

Proposals are invited to include ad-hoc indicators to measure the progress against specific objectives of their choice that could be used to assess the progress during the project life. Indicators are expected to have clear and measurable targets.
**Type of Action**: Innovation action

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

**LC-SC3-ES-4-2018-2020: Decarbonising energy systems of geographical Islands**

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**Specific Challenge**: Energy production costs on geographical island are up to ten times higher than on the mainland; therefore the large-scale deployment of local renewable energy sources and storage systems brings economic benefits and, at the same time, contributes to decarbonising the energy system of the island, reducing greenhouse gases emissions and improving, or at least not deteriorate, air quality.

**Scope**: The proposed solutions will contribute to high levels of local renewable energy and a very significant reduction of the use of fossil fuel based energies (ideally achieving full decarbonisation for the whole island), covering also:

- Improve integration and use of digitalised smart grids and/or thermal networks based on high flexibility services from distributed generation, local power balancing, demand response and storage of electricity, heating and cooling, water, etc.; including innovative approaches to energy storage at different scales.
- Improved forecasting through comprehensive modelling of demand and supply (e.g. based on weather, wind, sun, etc.).

Projects should also deliver:

- Effective business models for sustainable solutions for Renewable Energy Communities, in line with the recently adopted Renewable Energy Directive (Directive (EU) 2018/2001);
- Practical recommendations arising from project experience on:
  - regulatory and legal aspects;
  - gender and socio-economics (Social Sciences and Humanities);
  - storage and flexibility solutions (from short to seasonal timescales);
  - data management, data processing and related cyber security;
- Contributions to environmental sustainability, in particular in view of the specificities of islands ecosystems;
- Large scale implementation of self-consumption solutions in households, buildings and/or districts, supported by microgrids and decentralised small-scale storage systems.

Proposals will involve at least two Follower islands (geographical islands). The follower islands are to be members of the consortium although their participation in the project can be limited to actions allowing them to develop plans to adapt similar solutions to their islands in a cost-efficient way. The size of the budget allocated to Follower islands should be
clearly correlated to their level of involvement in the project’s activities. Follower islands participation will focus on exploring, planning and initiating the replication of the deployed solutions adapted to the different local conditions. This has to take the form of a detailed replication plan delivered by the end of the project.

The TRL will range between 5 and 8 (see part G of the General Annexes). Proposers will indicate the estimates levels of TRL at the beginning and at the end of the project. Proposals will include a task on the analysis of obstacles to innovation under the current context and foresee the coordination on policy relevant issues (e.g. regulatory framework, business models, data management, consumer engagement) with similar EU-funded projects through the BRIDGE initiative. An indicative budget share of at least 2% is recommended for the research work associated with these issues and an additional 2% for the coordination effort.

If relevant, projects should cooperate with the European Islands Facility (LC-SC3-ES-8-2019), and aim to establish synergies with ongoing and planned work on islands in the 'Clean Energy for EU islands' initiative. To support this, an indicative budget share of at least 2% of the EU contribution is recommended, which for example could include the development of practical training material and courses for island inhabitants, based on the chosen objectives and deliverables.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 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 projects are expected to contribute to all the following impacts:

- reduce significantly fossil fuel consumption, by developing renewable energy-based systems (including heating and cooling and storage) that allow the island to go towards full decarbonisation goals in a shorter time frame;
- large-scale uptake of validated solutions on the same geographical island and/or on other geographical islands with similar problems;
- Facilitate the creation and/or increase the number of renewable energy communities;
- enhance stability of the power network for islands that are grid connected with the mainland.

Proposals are invited to include ad-hoc indicators to measure the progress against specific objectives of their choice that could be used to assess the progress during the project life. Indicators are expected to have clear and measurable targets. Proposals are also invited to identify if they impact on future investment perspectives (see also topic LC-SC3-ES-8-2019).

**Type of Action**: Innovation action

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

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**Specific Challenge:** The legislative proposals on the energy market that the Commission adopted on 30 November 2016 (the Clean Energy for all Europeans Package) and for which political agreement has been reached last year, in particular the revised Electricity Directive and the revised Electricity Regulation, promotes that network operators procure services (such as balancing, congestion management and ancillary services) from assets connected to the network both at transmission and at distribution level, in a coordinated way. This will enable more efficient and effective network management and optimisation, for the benefit of increased demand response and the ability to integrate increasing shares of renewables. The same pool of resources will be used by Transmission System Operators (TSOs) and Distribution System Operators (DSOs): actions by both can mutually affect each other. In cooperation with market participants and national authorities, they have to define the services they want to procure, and have to set up ways to procure them in a coordinated, transparent and non-discriminatory manner.

**Scope:** The focus is on one project that demonstrates the setting-up of markets and digital platforms where electricity TSOs and DSOs can procure grid services from suppliers, aggregators and possibly individual consumers. The focus is also on demonstrating how suppliers, aggregators and possibly individual consumers can use large-scale and small-scale assets/devices owned by consumers and connected to the electricity network to deliver such services to TSOs and DSOs, at a large-scale, i.e. at a size that has a systemic relevance for TSO and DSO operations. The aim is to demonstrate how such markets and platforms will increase cost-efficiency in (future) network operations and create consumer benefits by rewarding them for flexibility in energy (production or consumption) or power through the delivery of grid services, and to facilitate the implementation of the demonstrated markets and platforms by other TSOs and DSOs. Therefore, the markets and platforms should enable the integration of relevant digital technologies like Internet-of-Things, Artificial Intelligence, cloud and big data services.

The selected project should build on experience and best-practices from previous and ongoing projects (in particular those supported under the call LC-SC3-ES-5-2018-2020 in 2018), and aim to deliver one set of protocols and standards with respect to platforms for the procurement of grid services. Building on existing projects, the project will define, test and demonstrate in real-life the operation of integrated, system-based and coordinated markets and platforms, that TSOs and DSOs jointly set up with suppliers and aggregators (but that can also be operated by other parties), for (a set of) grid services, in particular balancing, congestion management, ancillary services. The selected project will also define, test and demonstrate how DSOs and TSOs procure and use these services in a coordinated, transparent and non-discriminatory manner for grid management purposes, in a way that:

- will contribute to the development of a seamless pan-European electricity market that makes it possible for all market participants (if necessary via intermediaries such as energy suppliers or aggregators) to provide grid services in a market that is transparent and non-discriminatory;
SwafS Opportunities

- enables TSOs and DSOs to improve predictability and anticipate network problems, through the procurement of services via markets that incentivise connected consumers, buildings, devices (including small-scale generation) to adapt their energy (consumption or production) or power;
- facilitates scaling up the platforms and markets to spread its use by making it as easy as possible for suppliers, aggregators or consumers directly to offer grid services based on other or new small-scale and large-scale assets/devices on these markets, if necessary through as easy and automated pre-qualification processes as possible, Facilitating scaling up can also be done through integrating new services into existing platforms and/or links new services to existing markets as much as possible, by taking into account the ability to integrate future network services that support the energy network transition (e.g. those needed in scenarios with large RES penetration) and by being compatible across borders in line with EU rules, including applicable rules on market coupling and balancing;
- demonstrates scalability to deal with the increasing amount of data coming from more and more connected assets/devices that can provide grid services and requires near real-time big data processing, by developing and testing the appropriate ICT infrastructure;
- allows procurement based on the specific location and grid conditions (if necessary); The selected project also will:
  - Define the needs of network operators for system operation, and turn these into services and products, based on interaction with suppliers, aggregators and energy service companies, that test what services can be provided by what assets;
  - define and test 1) standardised products and key parameters for grid services; 2) the activation process for the use of assets for these services; 3) the settlement process for payment related to these services; 4) simultaneous procurement of these services by a TSO and a DSO from assets in the DSO network that are connected to that TSO’s network;
  - recommend a limited set of standardised products and key parameters for grid services that as reference for any TSO or DSO in the European electricity market;
- Verify the effectiveness of the services and products with respect to the technological capabilities of the assets (e.g. duration, ramp-up/ramp-down, islanding), including to ensure reliability of supply under different network conditions;
- Design and develop ICT systems and infrastructure that will facilitate open (non-proprietary) standardised and interoperable multi-party data-sharing and facilitate scaling-up, including across borders (at least in the EU), between all actors that use the markets and platforms for grid services. This shall be based on a description of the technical requirements and the specifications at the level of the interfaces required for the markets and platforms for grid services (e.g. between DSOs and TSOs: TSOs and TSOs; DSOs and DSOs; TSOs and suppliers/aggregators/consumers/prosumers; DSO and suppliers/aggregators/consumers/prosumers) and shall include ways to effectively address cyber-threats.
  - make use as much as possible existing open reference architectures, such as FIWARE, and ongoing developments, in particular through a close cooperation with the projects selected under the call ‘DT-ICT-11-2019: Big data solutions for energy’;
- Aim to deliver one set of protocols and standards with respect to platforms for the procurement of grid services;
Identify the relevant system data that enable market participants to better assess and forecast the need for grid services and publish such data (as much as possible);

- Test innovative ways to promote consumer participation, engagement and perception, such as peer-to-peer trading, and innovative ways to secure transactions, such as via distributed ledgers and blockchain;

- investigate the possibilities for innovative pricing and compensation (including through local markets) for consumers that own or use the assets that provide the grid services, taking into account tariff and tax systems;

- Provide recommendations to TSOs and DSOs for improvement paths in system operation to enable the integration of new services and products in system operation;

- Include a credible business plan to ensure that the tested and demonstrated platforms and markets will continue operation (and further will be further replicated/developed by as many other TSOs and DSOs as possible) in real-life after the project ends;

In relation to the organisation, the selected project is expected to:

- Make use of financial support to third parties for at least 2.5% of the EU contribution to the project for the incorporation of developers (SMEs and start-ups) of innovative energy services (in particular for household consumers).

- Cooperate with projects supported under the topic LC-SC3-EC-3-2018-2020 that approach the challenge more from a consumer’s perspective and work with Digitisation of Energy projects, funded under the following topics:
  - SC3-ES5-2018, and ensure that selected projects build on the ongoing work of those selected in 2018;
  - DT-ICT-10-2018: Interoperable and smart homes and grids;
  - DT-ICT-11-2019: Big data solutions for energy; as well as with the projects funded under topic LC-SC3-EE-13-2018-2019-2020: Enabling next-generation of smart energy services valorising energy efficiency and flexibility at demand-side as energy resource where innovative consumer energy services will be developed and tested regarding their business viability and consumer acceptance.

For this purpose, proposals must foresee a work package for cooperation with other selected projects and earmark appropriate resources (5-10% of the requested EU contribution) for coordination and communication efforts and research work associated with cross-cutting issues. This collaboration will be formalized in a dedicated work package.

- Coordinate their work with NRA's, ENTSO-E, the DSO organisations and other stakeholders and take into account the experience from other projects through cooperation in the BRIDGE initiative. An indicative budget share of at least 2% of the EU contribution is recommended for the cooperation activities under the BRIDGE initiative.

TRL will range between 5 and 8 (see part G of the General Annexes).

Proposals should comply with the requirements stated in the section 'Common requirements' of the introduction to the part on the Smart citizen-centred energy system.
The Commission considers that proposals requesting a contribution from the EU of between EUR 20 to 22 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:** Solutions will demonstrate how markets and platforms for grid services will enable cost-efficient model(s) for electricity network management and integrate higher shares of renewables to support the energy transition. Solutions will also demonstrate how markets and platforms for grid services can be implemented at systemic level in real-life and how they can be scaled up and are replicable across the EU energy system. Solutions will also contribute to opening up significant new revenue streams for consumers and (small-scale) producers to provide grid services, and increase the hosting capacity of RES in the electricity system through smart grid management. They will provide the foundations for new network codes, for example on demand-response.

**Type of Action:** Innovation action

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

**LC-SC3-ES-12-2020: Integrated local energy systems (Energy islands): International cooperation with India**

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**Specific Challenge:** The fast growth of energy production from renewable energy sources offers new and economically attractive opportunities for decarbonising local energy systems (e.g. isolated villages, small cities, urban districts, rural areas with weak or non-existing grid connections). It is also a technological and financial challenge for the electricity network to integrate more renewables, but it is also an opportunity to optimise the electricity system operation in synergy with other energy carriers/vectors to increase the hosting capacity for renewables, not just for electricity but also for heating/cooling, transport and/or industry in a sector coupling approach. Novel approaches to optimize network architecture, planning and development based on the opportunities offered by integrated local energy systems and enabled by digitalisation and power electronics can contribute to addressing the challenge, as can storage of electricity in all energy vectors (e.g. electricity, heating, cooling, water, wastes, etc.), including possibilities offered by batteries and electric vehicles.

Integrated local energy systems can be used to create economically attractive conditions to boost local energy sources and activate local demand-response. Innovative approaches, for example based on Renewable Energy Communities, in line with the recently adopted Renewable Energy Directive (EU) 2018/2001, can result in attractive business cases for local investments in smart integrated energy systems with weakly or non-existing grid connections. At the same time, decarbonisation can go hand-in-hand with the improvement of local air quality and citizens’ engagement.
Scope: Proposals will develop and demonstrate solutions which analyse and combine, in a well delimited system, all the energy vectors that are present and interconnect them, where appropriate, to optimise their joint operation that is demonstrated by an increased share of renewables in and higher energy efficiency of the local energy system.

Proposals should present a preliminary analysis of the local case as part of the content of the proposal and propose to develop solutions and tools for the optimisation of the local energy network, that also have a high replication potential across Europe and India.

Local consumers, small to medium industrial production facilities and/or commercial buildings should be involved in the projects from the start, preferably by creating energy renewable energy communities.

In bi-lateral discussions between India and the EU, as well as in several international contexts such as the Mission Innovation initiative launched at COP21, the Clean Energy Ministerial and the International Energy Agency Implementing Agreement on Smart Grids (ISGAN), this topic was identified as being of common interest owing to its potential for decarbonisation. In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation with India is required under this topic.

The cooperation must be under the form of a proposal demonstrating a local energy system (or several local energy systems) in either the EU/Associated Countries or India or both, and through a project work programme with meaningful contributions by both consortium partners from the EU/Associated Countries and India.

Mutual learning and extensive exchange between demonstrations in European and Indian contexts is encouraged under this topic.

This topic is co-funded by the Horizon-2020 programme and the Indian Department of Science and Technology (DST). European partners in selected proposals will receive Horizon 2020 funding while the Indian partners will receive DST funding.

TRL will range between 5 and 8 (see part G of the General Annexes). Proposals will indicate the estimated levels of TRL at the beginning and at the end of the project.

Proposals will include a task on the analysis of obstacles to innovation in both the EU and Indian context and foresee the coordination on policy relevant issues (e.g. regulatory framework, business models, data management, consumer engagement) with similar EU-funded projects through the BRIDGE initiative as well as with similar India-funded projects. Coordination and synergies will be explored and, if relevant to the project, may be established with the Clean Energy for EU Islands initiative. An indicative budget share of at least 2% is recommended for the research work associated with these issues and an additional 2% for the coordination effort.

It is considered that proposals requesting a contribution from the EU and the Government of India of between EUR 5 to 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 supported projects are expected to contribute to all the following impacts:

- Validate solutions for decarbonisation of the local energy system while ensuring a positive impact on the wider energy infrastructure, on the local economy and local social aspects, and local air quality;
- Enhance the involvement of local energy consumers and producers, preferably by creating energy communities in the development and the operation of local energy systems and test new business models;
- Validate approaches, strategies and tools to safely and securely operate an integrated local energy system across energy vectors (electricity, heating, cooling, water, wastes, etc.) so that it is able to integrate higher shares of renewables (than it would in case of separate operation of infrastructures);
- Benchmark technical solutions and business models that can be replicated in many local regions and that are acceptable by local citizens.

Proposals are invited to include ad-hoc indicators to measure the progress against specific objectives of their choice that could be used to assess the progress during the project life. Indicators are expected to have clear and measurable targets.

Type of Action: Innovation action

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

LC-SC3-SCC-1-2018-2019-2020: Smart Cities and Communities

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Specific Challenge: The COP21 Paris Agreement recognises the role of cities and calls on them to rapidly reduce greenhouse gas emissions and adapting to climate change. The EU is committed to implementing the 2030 Agenda for Sustainable Development, including Sustainable Development Goal 11 ("Make cities inclusive, safe, resilient and sustainable"). Many forward-looking cities have set themselves climate goals whose achievement rests on wide scale roll out of highly integrated and highly efficient energy systems.

To achieve the necessary energy transition in cities, it is essential to increase energy systems integration and to push energy performance levels significantly beyond the levels of current EU building codes and to realize Europe wide deployment of Positive Energy Districts by 2050.

This call will also contribute to the specific objectives of the SET Plan action 3.2 - Smart cities and communities - focussing on positive-energy blocks/districts.

Scope: Integrated innovative solutions for Positive Energy Blocks/Districts will be developed and tested and performance-monitored in the Lighthouse Cities. Projects will consider the interaction and integration between the buildings, the users and the larger energy system as
well as implications of increased deployment of electro-mobility, its impact on the energy system and its integration in planning. Lighthouse Cities will closely collaborate with Fellow Cities and should act as exemplars helping to plan and initiate the replication of the deployed solutions in the Fellow cities, adapted to different local conditions. As a sustainable energy transition will see increased electro-mobility, its impact on the energy system needs to be understood and well integrated in planning.

**Definition:** Positive Energy Blocks/Districts consist of several buildings (new, retro-fitted or a combination of both) that actively manage their energy consumption and the energy flow between them and the wider energy system. Positive Energy Blocks/Districts have an annual positive energy balance. They make optimal use of elements such as advanced materials (e.g. bio-based materials), local RES, local storage, smart energy grids, demand-response, cutting edge energy management (electricity, heating and cooling), user interaction/involvement and ICT.

Positive Energy Blocks/Districts are designed to be integral part of the district/city energy system and have a positive impact on it (also from the circular economy point of view). Their design is intrinsically scalable and they are well embedded in the spatial, economic, technical, environmental and social context of the project site.

To increase impact beyond the demonstration part of the project, each Lighthouse City and Fellow City will develop during the project, together with the consortium partners, its own bold city-vision for 2050. The vision should cover urban, technical, financial and social aspects. Each vision will come with its guide for the city on how to move from planning, to implementation, to replication and scaling up of successful solutions.

Proposals should also:

- Focus on mixed use urban districts and positively contribute to the overall city goals;
- Develop solutions that can be replicated/gradually scaled up to city level. The technical, financial, social, environmental and legal feasibility of the proposed solutions should be demonstrated in the actual proposal.
- Make local communities and local governments (particularly city planning departments) an active and integral part of the solution, increase their energy awareness and ensure their sense of ownership of the smart solutions. This should ensure sustainability of Positive Energy Blocks/Districts;
- Promote decarbonisation, while improving air quality, also assessing the benefits of the implemented solutions by means of Life Cycle Assessment and air quality modelling.

Projects will incorporate performance monitoring of at least 2 years of deployed solutions from the earliest feasible moment. All relevant performance data must be incorporated into the Smart Cities Information System database (SCIS).

Projects should also deliver:

- Effective business models for sustainable solutions;
- Practical recommendations arising from project experience on: regulatory, legal aspects and data security/protection; gender and socio-economics (Social Sciences and Humanities); storage solutions (from short-term to seasonal);
big data, data management and digitalisation;
electro-mobility: i) its impact on energy system and ii) appropriate city planning
measures to support large scale roll-out;

Eligible costs are primarily those that concern the innovative elements of the project needed to:

- connect and integrate buildings;
- enable Positive Energy Blocks/Districts;
- foster innovative systems integration;
- complement the wider energy system.

Costs of commercial technologies are not eligible, for example:

- Buildings: purchase, construction, retrofitting and maintenance;
- Electric vehicles and charging stations: purchase, installation and maintenance;
- City-level ICT platforms: purchase, development and maintenance;
- Standard, commercially-available RES: purchase, development and maintenance.

Projects are expected to cooperate with other Smart Cities and Communities projects
funded under Horizon 2020 in the Smart city Lighthouse group as well as the European
Innovation Partnership on Smart Cities and Communities (EIP-SCC).

Therefore, proposals will foresee a work package for cooperation with other selected
projects and earmark appropriate resources (5% of the requested EU contribution) for
coordination and communication efforts and research work associated with cross-cutting
issues.

Projects can make use of financial support to third parties for up to 5% of the EU
contribution to the project for the incorporation of relevant innovation boosting
activities/actions (e.g. SMEs, start-up competitions, Prizes, etc).

The Commission considers that proposals requesting a contribution from the EU of between EUR 15 to 20 million would allow this specific challenge to be addressed appropriately.
Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Typically, projects should have a duration of 48 to 60 months.

**Expected Impact:** Projects should contribute to:

- Meeting EU climate mitigation and adaptation goals and national and/or local energy,
  air quality and climate targets, as relevant;
- Increased share of i) renewable energies, ii) waste heat recovery and iii) storage
  solutions (including batteries) and their integration into the energy system;
- Lead the way towards wide scale roll out of Positive Energy Districts;
- Significantly improved energy efficiency, district level optimized self-consumption,
  reduced curtailment;
- Increased uptake of e-mobility solutions;
- Improved air quality.

The higher the replicability of the solutions across Europe, the better.

**Type of Action:** Innovation action
The conditions related to this topic are provided at the end of this call and in the General Annexes.

LC-SC3-SCC-2-2020: Positive Energy Districts and Neighbourhoods for urban energy transitions

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Specific Challenge: The ambition of the SET-Plan Action 3.2 is the planning, deployment and operation of 100 Positive Energy Districts/Neighbourhoods (PED/PEN) in Europe by 2025. This requires integrated and holistic sustainable system approaches including technological, social, urban planning, economic, financial and legal/regulatory perspectives. Tackling such challenges, calls for integrated and innovative solutions to spur the implementation of Positive Energy Districts and Neighbourhoods on larger scale. The aim is to accelerate the ongoing energy transition and to support the parties to the Paris Agreement to reach their national greenhouse gas emissions targets, and so contribute to achieve sustainable urban transformation process to decrease greenhouse gas emissions and ensure high liveability and affordability for citizens.

Scope: Proposals will mobilise networks of national (and/or regional) research, innovation and demonstration programmes in the field of smart and sustainable cities and sustainable decarbonised integrated energy systems. They will pool the necessary financial resources with a view to implementing a joint call for proposals resulting in grants to third parties with EU co-funding in this area, and for related programme management, synthesis and dissemination of the results. Activities funded through the joint calls should focus on a circular, resource efficient and low carbon integrated system perspective. The joint calls should include the following three formats, which should be interlinked and integrated to achieve highest impact.

The joint calls will firstly include applied research, strategic innovation and demonstration projects to develop specific innovative approaches and solutions for the planning, implementation and operation of PED/PENs, which are relevant in many European cities and urban areas. Strategic innovation projects resulting from the joint calls should create opportunities for cross-linking and collaboration and target more than one of the following aspects:

- increasing energy efficiency of neighbourhoods and reduction of performance gaps, reducing climate impact and facilitating energy transition at urban scale promoting integrated and holistic approaches through optimization of the energy system in the built environment, innovative building solutions and innovative approaches for interoperability of new and existing technologies;
- integrating renewable energy production and transformation technologies to support and optimize storage and transfer of locally produced energy to other parts
of the districts for synthetic on-site energy production and supply, including flexibility and resilience of PED/PENs through concepts for seasonal transferability of energy as well as PED/PEN integration in regional energy systems through flexible and optimised energy consumption within the district and through compensation measures and smart interfaces to balance real-time energy supply and promotion of the prosumer concept;

- **support integration and development of integrated and smart solutions for sector-coupling in PED/PENs** with focus on innovation need across energy, mobility, and ICT in a systemic setting, including user involvement and different socio-cultural target groups, local governance aspects and balancing urban green-blue-grey infrastructures;

- **streamlining and alignment of the spatial planning processes** and developing **digital planning strategies and optimization tools** (e.g. using building/neighbourhood information modelling (BIM)) along the entire life cycle of PED/PENs;

- **developing societal innovation, social entrepreneurship and citizen participation** aiming to integrate all relevant stakeholders to spur the implementation of PED/PENs within an integrated urban transformation process, where relevant, aspects of gender and diversity, inclusiveness and accessibility should be addressed and

- **developing business models for implementing and operating** PED/PENs on full scale that consider the whole process of planning, operation and operation of PED/PENs; as well as for refurbishment of existing housing stocks to safeguard accessible and affordable housing and sustainable mobility; engaging all actors such as users, owners, city authorities, real estate developer, operators of the energy infrastructure, and investors to create economically viable models for all parties.

The joint calls will secondly include the establishment of transdisciplinary and transnational innovation labs, innovation platforms and experimental areas for PED/PENs that facilitate the testing of prototypes, the co-creation and piloting of new concepts, approaches and urban designs, innovative formats and services in the planning, implementation and operation and replication phase of PED/PENs covering TRL 3-7. This should enable feasibility studies, field testing, sharing of test facilities, development of use cases and replication profiles for different PED/PEN types (e.g. new construction and retrofitting of neighbourhoods) to speed up the technology and service learning curves over the whole value chain. Particularly the PED/PEN innovation labs, innovation platforms and experimental areas shall bring together city administrations, PED/PEN business and industry, service developers/providers, and research organisations tying together actors bridging the whole value chain in different countries and regions.

The joint calls will thirdly include the development of **formats to build local capacity and institutional learning** in PED/PEN planning, development and operation with the aim to replicate and mainstream PED/PENs in a local, national and European environment. It should take into account the need to develop new public services and public innovation governance, in particular concerning effective public participation and challenge-driven approaches in practice. This should enable sharing of experience, development of standardised packages, adaptation of regulations, human capacity building/trainings etc.

Proposers are requested to include other joint activities including additional joint calls without EU co-funding.
The Commission considers that proposals requesting a contribution 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 ERA-NET Cofund will significantly support and contribute to:

- the testing, implementation and replication of 100 Positive Energy Districts and Neighbourhoods in Europe by 2025 as set out in the SET-Plan Action 3.2 Implementation Plan;
- transitions towards sustainable urban development, as set out in the UN SDGs and the Urban Agenda of the EU;
- the fulfilment of the role of Europe in Challenge 7 of Mission Innovation, where PED/PENs - a physical aggregator of technologies/solutions collaborating each other with the aim of promoting the transition to a sustainable urbanization - would be a decisive asset for the climate and energy performance of the European built environment; and
- an enhancement of European capacities and knowledge to become a global role model and market leader for the development of PED/PENs.

**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.*

**LC-SC3-NZE-6-2020: Geological Storage Pilots**

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**Specific Challenge:** The total geological storage capacity in Europe is estimated to be over 300 billion tonnes (Gt) of CO2. This is sufficient to permanently hold all the CO2 that could be captured in the EU for decades to come. The significant lead time for the development and permitting of geological storage, which is in the order of 7-10 years, demands speeding-up storage site identification and characterisation in Europe. The appraisal and development of storage capacity in promising regions has to provide the necessary confidence that the required CO2 storage capacity will be available when needed. In addition, storage pilots will play a crucial role in unlocking European CO2 storage capacity, assessing the potential risks and visualising CCS technology to the wider public. A portfolio of pilot storage sites in different geological settings, onshore or offshore, either in depleted hydrocarbon fields or in deep saline aquifers, is therefore needed to catalyse full-scale deployment of CCS in the medium to longer term.

This topic responds to the targets in the SET-Plan CCUS Implementation Plan to have at least 3 new CO2 storage pilots operating in different settings, and SET Plan countries having completed feasibility studies on applying CCS to a set of clusters of major industrial and other sources by 2025-2030.
Scope: The objective is to carry out the identification and geological characterisation of new prospective storage sites for CO2 (including the 3D architecture of the storage complex) in promising regions of future demonstration and deployment (onshore or offshore) through the implementation of new CO2 storage pilots. This will result in new data, knowledge and detailed models of potential storage complexes and their response to dynamic pressurisation. Important aspects include (but are not limited to): detailed geological characterisation, including faults and fracture systems; analysis of initial stress field and geomechanical behaviour of the storage formations and seals under varying stress and pore-pressure conditions; estimation of storage capacity; accurate modelling of injectivity; overall storage risk assessment, including induced seismicity and blow-out or blockage during injection, and including proposed mitigation action. Detailed plans should propose site-specific solutions for CO2 injection strategies, pressure management, mitigation of induced seismicity, and MMV (measurement, monitoring and verification).

For geological storage, in particular onshore, public acceptance is paramount. Therefore projects are expected to identify and engage relevant end users and societal stakeholders and analyse their concerns and needs using appropriate techniques and methods from the social sciences and humanities, noting the significant differences in potential regional consequences where the CO2 stored comes from power versus industry.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 7 to 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: Detailed geological characterisation and development planning of promising and safe storage sites and successful realisation of storage pilots will facilitate the subsequent application for storage permits and the kick-start of CCS in the concerned Member States and Associated Countries. Such a ‘pipeline of sweet spots’ can provide a baseline for estimation of storage cost, increase public awareness and help prepare the ground for full and active development into operational storage sites in the mid 2020’s.

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.
Specific Challenge: The clean-energy transition doesn’t just pose technological and scientific challenges; it also requires a better understanding of cross-cutting issues related to socioeconomic, gender, sociocultural, and socio-political issues. Addressing these issues will help to devise more effective ways of involving citizens and to better understand energy-related views and attitudes, ultimately leading to greater social acceptability as well as more durable governance arrangements and socioeconomic benefits.

Scope: In 2018, proposals must be submitted under the theme “Social innovation in the energy sector”, in 2019 under the theme “Challenges facing carbon-intensive regions” and in 2020 under the theme “Energy citizenship”. They have to address one or several of the questions listed under the respective sub-topics below. All proposals have to adopt a comparative perspective, with case studies or data from at least three European Union Member States or Associated Countries.

2020:

Energy citizenship: SSH research offers many insights into the conditions favouring civic engagement, active participation and interaction with institutional or corporate actors. Such “energy citizenship” is not limited to early technology adopters or environmental activists, and it goes beyond (but also encompasses) mere “consumer involvement”. Rather than using SSH research as an instrument to achieve particular outcomes (e.g., social acceptance) it can help to understand in what kind of environments collaborative goal setting and commitment can take place, how relevant decisions are made and any trade-offs between competing goals are addressed. This has important implications for EU energy policymaking. Proposals are expected to examine the factors affecting the emergence and effectiveness of energy citizenship and its potential for achieving the decarbonisation of the energy system. This should include factors such as digitalisation, social media, social group dynamics (e.g. creating trust, finding shared goals), societal factors (e.g. institutional, corporate or legal environment), demographics and social justice. It should result in practical recommendations for policy-makers. Specifically, proposals are expected to focus on one or several of the following questions:

- Is energy citizenship more likely to emerge locally, or at regional, national or supranational levels? For what reasons?
- What is the relative importance of processes internal to relevant social groups (e.g., creating trust and connection, finding shared goals and solutions, building coalitions), as opposed to external environmental variables (e.g., relative openness of institutional or corporate environments, availability of sympathetic interlocutors, access to financial or other sources of support, legal or other obstacles)?
- What impact does the digitisation of the energy system and the proliferation of social media have on the emergence and consolidation of energy citizenship?
- Under what conditions is energy citizenship conducive to reaching broader policy goals, particularly the decarbonisation of the energy system, and under what conditions does it have the opposite effect?

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 and 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 proposed research will:

- provide a better understanding of socioeconomic, gender, sociocultural, and socio-political factors and their interrelations with technological, regulatory, and investment-related aspects, in support of the goals of the Energy Union and particularly its research and innovation pillar;
- *Energy citizenship* (2020): based on a better understanding of socio-economic, gender, socio-cultural, and socio-political factors, their interrelations with technological, regulatory, and investment aspects, yield practical recommendations for harnessing energy citizenship to achieve the energy and decarbonisation goals in the European Union and Associated Countries.

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.*

Other Actions

2. RESponsible Island - Prize for a renewable geographic energy island

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<th>SwafS Key Word(s)</th>
<th>Public Engagement, Responsible Research and Innovation (RRI)</th>
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<tr>
<td>Deadline</td>
<td>2nd round: 1st quarter of 2020</td>
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The prize intends to highlight the potential of renewables for decentralized energy grids by addressing energy needs for electricity, heating, cooling and transport. The title is inspired by RES (short for Renewables) and "responsible" to highlight the citizen in the centre of the energy system. Within this context, the prize recognizes realised achievements in renewables on geographic energy islands.

Geographic energy islands are ideal test labs for the deployment of innovative energy technologies. The prize will reward integrated local RES production in a decentralized electricity grid and the achievements in decarbonizing heating, cooling and transport. In this context, renewable energy consumed on the island is also linked to the renewable energy produced on the island, supporting its local value chains and self-engaging the local society as a RESponsible prosumer.

The prize is in line with the objectives of the Political Declaration on Clean Energy on EU Islands and the Smart Islands Initiative and will contribute to Mission Innovation Challenge 2 ("Off Grid Access to Electricity Innovation Challenge").

The specific rules of the contest will be published by the European Commission at the beginning of each yearly competition. The European Commission will directly launch and
manage the annual contest and annual award the prize based on the judgement of independent experts.

The indicative budget for the prize is EUR 1.7 million from the 2020 budget, intended as award for two yearly competitions: EUR 0.5 million for the 1st place, EUR 0.25 million for the 2nd place, EUR 0.1 million for the 3rd place.

**Essential award criteria:** After closure of the contest, the prize will be awarded to the three best-ranked contestants, who in the opinion of the jury, best address the following cumulative criteria for the respective whole geographic energy island:

a. The share of renewable energy produced by innovative energy technologies on the island respective to the energy consumed on the island for electricity, heating and/or cooling and transport;

b. Environmental and socioeconomic sustainability and impact of the renewable energy solution;

c. Citizen and community involvement;

d. Replicability of the solution.

**Eligibility criteria:** The island shall be located within the territory of an EU Member State (including Overseas Countries and Territories linked to them) or an H2020 associated country and the prize is open to any legal entity or group of legal entities representing the respective island. Representation has to be proven through written representation agreement signed by the respective authorities responsible for the whole island. Participating islands must have permanent residents and an energy demand in electricity, heating and/or cooling as well as transport of at least 100 MWh/year overall.

Contestants that have already received an EU or Euratom prize cannot receive a second prize for the same activities.

For the common Rules of Contest for Prizes please see General Annex F of the work programme.

**Expected results:** The prize will highlight realised achievements/best practices in reaching the potential of renewable energy for covering electricity, heating, cooling and transport needs in off-grid societies, and in the introduction of innovative technologies to the market. It will be a recognition of a responsible local society committed to expanding the share of renewables. It will also provide excellent visibility for citizens participating in the promotion of innovative renewable energy technologies.

The recognised solutions are expected to have high replicability also to other isolated energy systems with islands characteristics worldwide in the context of Mission Innovation Challenge 2 by show-casing working business models.

**Indicative timetable of contest(s):**

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<th>Stages</th>
<th>Date and time or indicative period</th>
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<tr>
<td>Opening of the contest</td>
<td>1st round: 1st quarter of 2019; 2nd round: 1st quarter of 2020</td>
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<td>SwafS Opportunities</td>
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<tr>
<td>Deadline for submission of application</td>
<td>first round: 3rd quarter of 2019; 2nd round: 3rd quarter of 2020</td>
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<tr>
<td>Award of the prize</td>
<td>1st round: 1st quarter of 2020; 2nd round: 1st quarter of 2021</td>
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**Type of Action:** Recognition prize

**Indicative budget:** EUR 1.70 million from the 2020 budget

50. Research-oriented data sets and [open access database](#)

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<th>SwafS Key Word(s)</th>
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The action will contribute to enhancing the information infrastructure within the European Commission for the research and analytical use of the difference services of the Commission and eventually the public. It expected that such infrastructure could contribute to (but not exclusively): (1) setting up a data repository for the European Commission to store the outputs of its various projections exercises, as well as outputs from other institutions and stakeholders for multi-source comparison purposes of interest for the European Commission; (2) strengthening the existing Energy Market Data service, as well as (3) setting up an e-reporting platform in the context of the energy and climate governance and the upcoming reporting process on 2030 framework. As such it will enhance the Commission’s (and eventually public) capacity to undertake robust research and analysis of energy policies.

**Type of Action:** Public Procurement - null

**Indicative budget:** EUR 2.80 million from the 2020 budget
Societal Challenge 4: Smart, green and integrated transport

Call - 2018-2020 Mobility for Growth

LC-MG-1-12-2020: Cities as climate-resilient, connected multimodal nodes for smart and clean mobility: new approaches towards demonstrating and testing innovative solutions

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<th>Gender Equality, Public Engagement, Responsible Research and Innovation (RRI)</th>
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<td>Deadline</td>
<td>CSA: 21 April 2020 17:00:00 Brussels time; IA: 09 January 2020 17:00:00 Brussels time; 2nd stage: 08 September 2020 17:00:00 Brussels time</td>
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Specific Challenge: Europe's urban areas are struggling to develop themselves into well-connected multimodal and multi-usage nodes for smart and clean mobility. Multiple trends affect urban and inter-urban areas: urban growth, densification, digitalisation, increasing pressure from freight movements and a shift to a service-oriented economy. Moreover, many European cities and regions areas are committed to develop into zero-emission areas. New technologies and innovative measures are emerging, but they are not taken up at a scale that is necessary to meet our climate targets and European transport policy objectives. In many instances, the responsible authorities (often operating at different governance levels) cooperate with public and private stakeholders. But the full integration and implementation of new solutions lags behind because little information, data and tested, innovative solutions are available on their effectiveness and on how to overcome the barriers to successful implementation into older legacy systems and ageing infrastructures.

Scope: This topic is divided in 3 sub-topics.

Innovation Action:
The first part of this topic invites for proposals that combine new technologies and non-technological innovations, more effective forms of governance, and accompanying (policy-based) measures for all modes of transport. The proposed projects should be carried out by local/regional authority-led consortia, covering three different urban or inter-urban areas that have a connection with the TEN-T network or an equivalent size, major transport corridor, each of them facing different spatial, social and/or economic challenges and/or experiences with the organisation of large/sport events. Each urban area should establish a living laboratory where under real life-conditions a set of innovative, complementary and reinforcing scalable mobility solutions, centered around a principal solution can be developed, tested and implemented in an integrated, multimodal approach. The participating urban areas, which may have a geographical coverage that goes as far as the full functional urban area, should demonstrate their common interests and outline how they will ensure a meaningful and close cooperation. Proposals should outline how the proposed approach meets the needs of an efficient, flexible and accessible TEN-T urban node or a city located at an equivalent sized transport corridor, which in turn delivers an optimal use of the transport network and the integration of cost-effective solutions for
energy supply/storage (with use of renewable energy as much as possible) and recharging networks for transport, and ICT networks for all modes of transport. The work of relevant Horizon 2020-funded projects, such as VITALNODES, could provide a useful starting point.

Proposals should explain how the proposed work will support the public authorities' efforts to implement their Sustainable Urban Mobility Plan, in combination with urban (land) planning and development, and infrastructure planning and operations. Attention should be paid to issues related to vulnerable groups of citizens, gender issues and health impact of mobility. Actions may include research activities, and some preparatory, take up and replication actions, as well as the development of tools to support planning and policy making. Work may also include demonstration of a resilient urban mobility system, capable to address particular challenges in the organisation of large/sport events. Proposals are encouraged to incorporate new approaches to increase the availability and integration of data to support policymaking and business activities in smart, zero and low-emission mobility and to explore innovative ways of increasing the share of active modes of transport.

To capture impacts, the activities should include monitoring, for example, aspects such as modal share, energy intensity, level of emissions, impact on health, transport network performance (demand and supply) and connectivity through interoperability and multimodality. Projects are expected to collaborate with the established impact evaluation framework (using both clear baselines and measurable impact indicators), as well the dissemination and information exchange framework put in place in the field of urban mobility by the Commission. Additionally, proposals should seek to establish financial and institutional/organisational cooperation models to enable seamless transport across the TEN-T urban node area or equivalent.

The Commission considers that proposals requesting a contribution from the EU of between EUR 7 to 9 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Typically, projects should have duration of 48 months and foresee sufficient time for evaluation, dissemination and exploitation activities.

**Coordination and Support Action: fast-track and mainstream the replication of innovative, urban, peri-urban and rural mobility solutions**

The second part of this topic is a Coordination and Support Action that aims to fast-track and mainstream the replication of innovative, tested urban, peri-urban and rural mobility solutions (e.g. technological, non-technological, services, goods and infrastructure). Proposals are expected to set up and run a 'Fast-track to innovative sustainable motorised and non-motorised mobility' action (working title – proposers are invited to choose an appealing title), which offers support and services to at least 20 cities and municipalities or their organisational/functional groupings. A 'staged approach' is possible – taking into account mobility, investment or geographical needs as well as delivering the project efficiently. At least one-third of these 20 locations should be located in areas experiencing rapid economic and social change.

The proposal should include all of the following actions:
• Support for the development and towards implementation of innovative mobility solutions in 4 broad areas:
  1. Investments in and management of the transport network
  2. Supporting modal shift towards more energy-efficient, safer and active (whenever possible) modes for transport of freight and/or passengers
  3. New operating and business models in collective public and private transport (in any transport mode).
  4. Supporting mobility actions within the scope of the European Innovation Partnership in Smart cities and communities (or its successor working on smart cities).

• Development and implementation of a programme of tailored actions to deliver capacity building and institutional networking by:
  a. Supporting staff exchanges, expert visits, and short term training.
  b. Supporting the identification and access to financial and legal expertise, to define the feasibility to replicate an innovative mobility solution and to develop an innovation deployment programme of scale, notably: meetings with (potential) investors, opportunities for follow-up investments and identification of synergies with European funding and financing.
  c. Providing matchmaking services for innovative mobility solutions establishing the link between "suppliers" that may be both public and private organisations, or groupings thereof (such as Horizon2020 funded projects) and "customers" that are mainly public organisations (such as city councils, regional authorities, transport operators or their groupings).
  d. The project should deliver a set of recommendations to bridge the gap in the research and innovation performance and the deployment of the innovative mobility solutions across EU Member States.

The Commission considers that proposals requesting a contribution from the EU of EUR 1 to 1.5 million each would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

**Coordination and Support Action: prepare for the deployment of Urban Air Mobility in urban and peri-urban areas**

The integration of vertical urban mobility solutions (drones, and other forms of low-aerial mobility, as well as services) into existing surface multimodal transport (both freight and passenger) systems will add further complexity to the organisation of the urban and peri-urban transport and mobility services. It will require changes in public/shared transport management, logistics operations and infrastructure operations. With rapid technological progress in urban air mobility, especially local and regional public sector authorities are faced with challenges such as in financing, procuring, planning (infrastructure, systems), transport operations, safety, noise, security and public acceptance of these solutions.

The proposal should include all of the following actions:
a) To provide a knowledge base (dynamic updated, with a "brand") and to deliver a set of policy recommendations (in at least 8 languages – for use by local, regional, national and European public authorities, businesses and other organisations) for measures to (seamlessly) integrate the vertical and horizontal dimensions in urban and peri-urban mobility systems. These are notably:

- Minimum required standards for products and processes in for ITS-type applications, urban planning (SUMPs), data-exchange, energy infrastructure, payments, environmental objectives, travel information and possibly other sectors such as building, construction, health care, retail etc.
- Foresight deployment scenarios of up to 10 possible use cases in 5 to 15 years; public acceptance, governance, mobility systems, energy supply systems, infrastructure, investment opportunities, funding and financing needs, and land-use. An approach to set up these scenarios with wide consultation should be included in the proposal to ensure that social acceptance aspects are fully understood.
- Tools for exchange and learning of urban air mobility with and to public authorities (notably local and regional), businesses civil society and research organisations.

b) To provide specific project development support and technical assistance for up to 10 deployment 'use cases' in locations (or groups thereof) with a demonstrated commitment from public and private organisations that are planning to start testing urban air mobility applications in the next 3 years. The type of support should as minimum include feasibility and market studies, programme and urban planning actions (for example procurement strategies).

This proposal should work closely together with the ongoing actions of the European Innovation Partnership in Smart cities (or its successor) and CIVITAS (or its successor) and possibly other networks with a strong participation of local and regional authorities.

The proposal should propose actions for cooperation with EASA, the SESAR Joint Undertaking, EUROCONTROL and the European U-Space Demonstrator network to ensure that project results are fed into developments in the institutional, regulatory and architectural frameworks for a competitive U-space services market.

The Commission considers that proposals requesting a contribution from the EU of EUR 1 to 1.5 million each would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

For the Innovation Action:

Projects should act as European demonstration-type ("lighthouse") examples for integrating new scalable technologies and measures into city transport operations and existing transport infrastructures at real-life scale in order to achieve long-term decarbonisation impacts; reliable solutions for a more sustainable, inclusive, safe and secure mobility system, including for the secure mobility of people and freight during major/sport events; clear improvements of the efficiency and accessibility of the transport networks/systems covering the TEN-T urban nodes or equivalent, and their access to the relevant TEN-T corridor(s) or equivalent transport corridors for transport of freight and/or passengers. Positive long term
impacts on social cohesion, economic development and public perception – resulting in behavioural change and policy change - are anticipated.

Projects will contribute to the development of the existing European knowledge base on the effectiveness and impacts resulting from the implementation of innovative mobility solutions. Clear commitments and contributions to Europe-wide take up during and beyond the project are expected, which could for example be in the form of follow-up actions funded by CEF or similar programmes.

This topic complements CEF-funded activities.

For the Coordination and Support Action: fast-track and mainstream the replication of innovative, urban, peri-urban and rural mobility solutions.

The following three main impacts are foreseen:

Firstly, proposals are expected to demonstrate how their activities will lead to fast-tracking and mainstreaming the replication of innovative, urban, peri-urban and rural mobility solutions. Proposals should as a minimum requirement provide; the expected number of people involved in the activities that will be undertaken in at least 20 cities/municipalities addressed by the project, information as to how their capacity will be improved to develop urban mobility and investment plans for deployment of innovative transport solutions. Secondly, the CSA is expected to lead to new research and innovation collaborations in sustainable urban mobility between organisations (public/ private), especially those located in countries that are more advanced and those located in countries lagging behind in the deployment of urban mobility innovations.

For the Coordination and Support Action: prepare for the deployment of Urban Air Mobility in urban and peri-urban areas

This action is expected to address the Amsterdam Drone Declaration which "called upon urban transport actors, policy makers and associations to pioneer cases demonstrating which systems, solutions and services seamlessly integrate smart multimodal solutions" and which "invited cities and regions to co-create with the citizens the public conditions and the infrastructure for integrated air and ground smart mobility solutions to flourish, where new and clean technologies, big data, real-time information and corresponding business models converge towards the enablement and realisation of “mobility as a service”.

The expected impact of this CSA project is to provide especially cities and regions with better planning tools and knowledge to integrate new applications of urban air mobility in their passenger and freight systems. This topic complements topic 'MG-3-6-2020: Towards sustainable urban air mobility'.

Type of Action: Innovation action, Coordination and support action

The conditions related to this topic are provided at the end of this call and in the General Annexes.
**LC-MG-13-2020: Decarbonising long distance shipping**

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<td>Deadline</td>
<td>09 January 2020 17:00:00 Brussels time, 2nd stage: 08 September 2020 17:00:00 Brussels time</td>
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**Specific Challenge:** In 2018 historic targets were agreed within International Maritime Organization (IMO) to cut the total net global GHG emissions from international shipping by at least 50% by 2050, to reduce carbon intensity by at least 40% by 2030 compared to a 2008 benchmark and to completely decarbonise shipping by the end of the century.

Presently shipping accounts for around 2.5% of global GHG emissions and although ships are becoming more efficient, due to increasing global trade this contribution is increasing. These emissions are more than any EU state and if the sector was a country, it would rank as the sixth highest in the world. In 2015, shipping accounted for 13% of overall EU greenhouse gas emissions from the transport sector. Overwhelmingly, long distance shipping accounts for the majority of GHG emissions and its decarbonisation is particularly challenging. It is expected that solutions will need to combine a variety of technologies, operational practices, energy sources and efficiency measures. Furthermore, it will be essential to link any measures to robust data and measurements to better quantify their effectiveness and optimisations.

**Scope:** All following aspects should be addressed:

- Working together with, for example operators, ship builders, marine equipment manufacturers, fuel and energy suppliers and others research will address the development of technologies combined with operational practices to substantially reduce GHG emissions from long distance shipping in line with the IMO target and without increasing other forms of pollution.
- Excluding fuel development, a wide range of potential solutions can be proposed including the use of wind and solar assistance combined with efficiency improvements and other alternate energies. Solutions can be proposed in combination and should take into account the likely availability of infrastructure (including bunkering) on long distance routes.
- Solutions should also take into account the CO2 equivalent from any reduction of black carbon emissions.
- Costs, GHG reductions and any other potential waste streams shall be convincingly analysed using real data and testing programmes in addition to theoretical analysis.
- Implications for the provision of new infrastructures shall be quantified and assessed.
- To at least TRL5, technologies, systems and practices shall be tested at full scale on operational shipping. The differences between predicted and measured data should be identified.
- Any reduction in GHG emissions that are founded upon innovative operational practices must be robustly benchmarked against the current state of the art, for example concerning ship routings and speeds through the use of “big” AIS “data” and/or other satellite data.
• A robust communication strategy should be developed and implemented so as to ensure wider public engagement as well as a strong engagement with the global shipping sector and its customers.

• Cooperation with IMO and EU activities and fora concerning the decarbonisation of shipping is encouraged. Build upon and cooperate with any related activities and research.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 to 10 million would allow the specific challenge to be addressed appropriately.

Expected Impact: Development of innovative solutions to decarbonise shipping that exceed the IMO’s 2050 target to decarbonise by 50% and which are applicable to ship types that are the largest emitters of GHGs such as: bulk carriers, tankers, container ships, cruise ships and passenger liners. Establishment of robust benchmarks and methods which will provide wide confidence of the “real world” impacts from any specific GHG reduction measure including potential scalability and any secondary environmental impacts. Improve the competitiveness of FAIR the awareness and take up by end users. Provide evidence to policy makers within EU and globally concerning infrastructure requirements necessary to meet the 2050 decarbonisations target.

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-MG-1-14-2020: Understanding and mitigating the effects on public health of emerging non-regulated nanoparticle emissions issues and noise

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Specific Challenge: Growing road traffic in Europe results in detrimental effects on the environment and public health in spite of the gradual emissions reduction due to increasingly stringent emission standards. Some technologies lead to particles of smaller and smaller size that influence the health of citizens living close to traffic, before aging in the atmosphere and contributing to background pollution. Secondary particles from gaseous and volatile engine exhaust components are also coming into focus as a significant health-affecting contribution. Moreover, the effects of some specific emissions (e.g. particles from tyres or natural gas engines) are either not sufficiently understood or remain undetected by current air quality or certification procedures. Finally noise (again in particular from tyres), remains an issue for larger road vehicles, since it would remain so even in the case they were progressively electrified.
Scope: Proposals can focus on one or both of the following subtopics, but must be ready to work in cooperation and share results with other selected or running proposals particularly as far as data and material for experimentation (particle samples for health testing, for instance) are concerned:

1) Transport nanoparticles

All bullet points within this subtopic must be addressed:

- Assessing and understanding the biological processes leading to negative effects on human beings and animals (including sex and gender differences, when relevant) in particular impacts of nanoparticles below 100 nm on carcinogenesis in multiple organs including both inflammation effects and the "Trojan Horse" effect of the different chemicals constituting or absorbed on the particles, as well as combined effects of the various components of exhaust gases. Work should consider both aged and fresh aerosols, include primary and secondary volatile and not volatile particles, in particular considering the significant emerging component of extremely fine nanoparticles (below 23 and even 10 nm) constituting a large share of exhausts from certain types of engines like gasoline and natural gas ones.

- Assessing if and what variability of these effects exists with size, chemical composition and morphology, linking as far as possible the impacts with specific emission sources and leading to an understanding and quantification of the risks posed by different types and sources of particles. This research should cover all types of transport-related particles sources (both exhaust and non-exhaust, from road, rail, aviation and shipping) taking into account results from previously funded research projects in the same areas.

- Evaluating the possible future impact of new policies in this area on public health and well-being of citizens and acceptance of the negative economic impacts that could derive from them.

2) Reduction of noise and particles emissions from tyres

All bullet points within this subtopic must be addressed:

- Assessment and characterisation (respectively for at least one representative car and truck tyre size), of the amounts of tyre particles emitted in different driving conditions (acceleration, braking, different constant speeds, corner driving) both in laboratory and on real roads with on-boards system, by implementing sensors and analysing nanoparticles characteristics (size, distribution, chemical composition) determining in particular the number and mass shares of particles contributing to PM10, PM2.5 and PM0.1. The effects of chemical transformations of these particles in the air, if any relevant ones are possible, should be assessed to verify if any other negative health effect can be defined and quantified.

- Evaluation of traffic noise effect on the cardiovascular system, assessing which type of noise (impulsive or background) has the most consequence on health taking into account sex and gender differences when relevant, in order to influence the development methodologies for limiting noise, and to anticipate future legislation and emerging issues.
• Develop innovative tyres of heavy-duty freight transport optimised for low noise, rolling resistance, wear and therefore particles emissions, particularly in cruise conditions, while keeping a sufficient level of all other relevant performance parameters (traction, skid resistance, etc.). Due consideration should be taken of all road surface types in Europe present on extra-urban roads, and potential for co-optimisation should be considered if this can deliver global benefits without compromising the specific design features of tyres and road surfaces in the different environments for which they have been developed and for other types of vehicles (i.e. an improvement of road surface for trucks should not lead to worsening performances for other vehicles).

• From the above experience, development of reliable and repeatable methodologies for the assessment and comparison of tyre emissions and tread wear for potential future legislation.

• Particles tracing and quantification of the contribution of tyre wear to the microplastics issue in water bodies (rivers, lakes, seas..) and in the ground.

• **Evaluating the possible future impact of new policies in this area on public health and well-being of citizens and public acceptance of the negative economic impacts that could derive from them.**

Proposals in all areas could foresee international cooperation and experience and exploit synergies in view of establishing future international standards and regulations, including contributing to risk governance in the emerging field of nanomaterials (from which some input from relevant research projects could be gained as well).

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 to 4 million would allow this specific challenge to be addressed appropriately.

**Expected Impact:** The project resulting from these areas shall deliver the following impacts:

• Enhanced understanding of the health threats posed by particles and noise.

• Guidance for developing and prioritising mitigation measures in future legislation on air quality and emissions, taking into account social aspects.

• European and possibly global standards in critical industrial areas like engines and wear components (brakes, clutches and tyres).

• At least 6dB(A) truck tyre noise reduction in areas which will not benefit from zero emissions vehicles low powertrain noise, i.e. along motorways and urban/periurban thoroughfares at speeds between 50 and 90 kph, where truck tire noise is very relevant.

**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-MG-1-15-2020: Towards global environmental regulation of supersonic aviation

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<th>SwafS Key Word(s)</th>
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**Specific Challenge:** This action is part of the Aviation International Cooperation Flagship called "Safer and Greener Aviation in a Smaller World" mentioned in the introduction to this work programme 2018-2020.

Accelerated public and privately-funded development and demonstration efforts in the US, over the last years, aim towards the introduction of new commercial supersonic aircraft as early as 2020-2022. In parallel, the FAA Reauthorization Act of 2018 directs the Federal Aviation Administration (FAA) to take a leadership role in creating federal and international policies, regulations, and standards to certify safe and efficient civil supersonic aircraft operations. Other countries such as Japan and Russia are also investing in research on commercial supersonic aircraft.

The International Civil Aviation Organisation (ICAO) Assembly Resolution A39-1 instructs the Council to review its Annexes so as to ensure that they take due account of the problems that the operation of supersonic aircraft may create for the public. In response to this Resolution, the Committee on Aviation Environmental Protection (CAEP) is in the process of developing environmental standards and recommended practices (SARPs) under Annex 16. In October 2018 Austria on behalf of the European Union, of all EU Member States, of other Member States of the European Civil Aviation Conference and of Eurocontrol, submitted a working paper at ICAO (AN-Conf/13-WP/211). This European working paper presents the European views on the subject and urges a holistic environmental approach (noise and emissions) before considering the introduction of supersonic aircraft into the global air navigation system.

In response to this European working paper, the challenge for the EU is to act promptly and shape together with the International community high environmental standards in line with ICAO Assembly Resolution A39-1. Research is needed for better understanding the combined and interdependent environmental impacts of potential supersonic aviation on citizens, as well as on the European and international regulatory and certification processes.

The EU should remain a decisive player for thorough development of ICAO noise and emissions standards setting (CO2 and air pollutants). This topic supports this objective by developing expertise at European and international level.

Leveraging resources with international partners can help, on the one hand, in shaping the new global regulations in line with EU’s climate change Long Term Strategy, and on the other hand, in sharing costs, risks and benefits, as well as in ensuring a level playing field.

**Scope:** Proposals should timely assess the holistic environmental impact of potential supersonic aviation and provide evidence for public acceptance long with suitable international high environmental standards. Proposals should take into consideration the
results achieved within the EU projects FP6 HISAC (Environmentally friendly high-speed aircraft) and Horizon 2020 RUMBLE (Regulation and norm for low sonic boom levels). Proposals should also include the latest technological developments and explore potential solutions beyond the state-of-the-art, contributing to two or more of the following areas:

- Advance further high-fidelity environmental modelling integrated into multidisciplinary optimization of supersonic aircraft, trajectories and operations.
- Assess and explore physics-based pathways to decrease noise and emissions at airport/local and global level (i.e. CO2, NOx, water vapour as well as their impact to ozone concentration in the stratosphere). Assess their impacts to trajectory optimization and aeropropulsion technologies to further reduce sonic-boom level and emissions.
- Quantify the efficiency of sonic boom shaping in terms of various boom effects, and not only in terms of noise (e.g. sleep disturbance).
- Explore further the characterisation of indoor boom annoyance (relevant metrics, measurements devices and locations), in collaboration with EASA and other national and international agencies.
- Quantify sonic boom variability due to meteorology, turbulence, urban environment and buildings and address the development of certification processes that take into consideration the stochastic nature of sonic boom.
- Develop at European or International level, accepted and validated modelling tools that capture the physics of the generation and propagation of sonic booms, towards further contributing at ICAO level, according to the CAEP work programme and agenda.

The proposals may include the commitment from the European Aviation Safety Agency and European national civil aviation authorities to assist or to participate in the actions. In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged, in particular with countries such as the Russian Federation, United States of America, Japan, Canada, Brazil, Australia and South Africa. International cooperation can include work towards the development of enabling technologies, joint tests, standards and certification, taking into account bodies such as United Nations’ International Civil Aviation Organisation (ICAO).

Where applicable, proposals are encouraged to join international demonstration campaigns for noise and emissions assessments at all phases, including take-off and landing, provided that meaningful outcomes can be delivered according to CAEP work programme and agenda. The Commission considers that proposals requesting a contribution from the EU between EUR 3 and 5 million would allow this specific challenge to be addressed appropriately.

Nonetheless, this does not preclude submission and selection of proposals requesting lower or higher amounts.

**Expected Impact:**

- Maintain high level of environmental protection, especially in terms of global and local emissions and noise.
- Ensure suitable global regulations, standards, operational procedures and recommended practices for the protection of the citizens and of the environment.
• Contribute to maintain world-class knowledge and skills in Europe in the field of civil supersonic aviation.
• Contribute to stimulate disruptive innovation in civil aviation with spin-offs into other civil aerospace segments and other civil sectors.
• Contribute to inspire and engage new generations of students and engineers.

**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.*

**MG-2-10-2020: Enhancing coordination between Member States’ actions in the area of infrastructure research with a particular focus on biodiversity and ameliorating environmental impacts and full automated infrastructure upgrade and maintenance**

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<td>Deadline</td>
<td>CSA: 21 April 2020 17:00:00 Brussels time; RIA: 09 January 2020 17:00:00 Brussels time, 2nd stage: 08 September 2020 17:00:00 Brussels time</td>
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**Specific Challenge:**

1. **CSA subtopic**: Substantial national and EU funds are spent on transport infrastructure development in all modes of transport. The efficiency of these expenditures is closely related to the level of use of modern innovative and sustainable solutions and on coordination among Member States. In order to facilitate continuous cooperation and coordination among public and private actors and to improve the uptake of new sustainable solutions, a structured dialogue between relevant stakeholders should be initiated and sustained with the key objective of successful deployment of research results.

2. **RIA subtopic**: An area where research and coordination is needed is the use of robotised equipment, drones or other (semi)-automated remote-piloted solutions, offering significant potential to reduce workers exposure to live traffic and construction machines, to increase the availability of the transport network, as well as to automate and reduce the cost of repeatable tasks and safety upgrades. Significant advances in robotising the upgrade or maintenance of network infrastructures based on standardising, modularising and industrial prefabricating of large percentage of the infrastructure will ease the way to automate most construction, repair and retrofitting projects.

**Scope**: In order to meet these large challenges this topic will be implemented through two types of actions

1. **Coordination and Support Action**
Transport infrastructure can result in significant and lasting degradation of ecosystems and habitats. Considering Europe has the highest transport infrastructure density in the world, there is an urgent need to address this rapidly increasing challenge.

Stronger cooperation should be developed between national, regional, European and international supporting programmes and initiatives on research, innovation and deployment, aimed at improving transport infrastructure performance on environmental and social sustainability. For instance, synergies with Horizon 2020 and CEF projects, as well as with the EU biodiversity strategy to 2020 should be established, while building as much as possible from relevant existing proven structures and platforms of infrastructure stakeholders. In order to ultimately ensure sufficient deployment impact, the proposals should include the national transport infrastructure authorities with responsibility for managing their national networks from at least 10 countries (Member States or Associated Countries), ensuring strong engagement in relevant European platforms and wider reach.

Proposals should cover all the following issues:

- Successful roll-out of a Strategic Research and Deployment Agenda (SRDA) endorsed by the national transport infrastructure authorities and the public innovation programme owners, representing the societal and environmental needs and requirements for infrastructure innovation. The agenda will take input from the relevant industry stakeholders, in close cooperation with the research community as well as environmental agencies which will supply innovative solutions. and developing alternative and more-biodiversity-friendly transport modes (e.g. bicycle paths and highways).

- Particular focus should be on innovative solutions in the planning and design stage of the infrastructure life cycle as this stage offers the best opportunities for achieving environmentally sustainable transport infrastructure network for Europe’s citizens reducing the harmful impact on the environmental and social sustainability.

The proposal should include opportunities for adapting transport infrastructure in view of changing demand, social changes, climate, biodiversity, technology and digitalisation. The work will feed into the strategic research and innovation (R&I) agenda of the relevant stakeholders, which should be jointly developed and implemented by the transport authorities, the research community, the infrastructure operators and civil society. Clear priorities should be agreed and widely communicated so they can reflect an aim for building sustainable and environmentally-friendly infrastructure.

The Commission considers that proposals requesting a contribution from the EU for sub topic 1 (CSA) of between EUR 2.5-3 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. There shall be only one project selected for the sub topic 1.

2. Research and Innovation Action

This topic should be considered as a follow-up of previous calls on remote sensing, monitoring and decision support to maintenance planning, and should be taken into
consideration to develop the phase of intervention, to achieve the maximum automation possible in physical interventions to maintain the integrity, performance and safety levels of the infrastructure.

Proposals should cover all the following issues:

- Application of robotics and remote piloted systems to infrastructure upgrade or maintenance works to push the transport sector in the automated era and increase the overall productivity and efficiency of the transport infrastructure, thus relieving the burden of the costs on the users.
- Development of robotized equipment to perform routine, periodic or emergency maintenance works; adequate connections with the structural and functional monitoring sensors and traffic management system to deploy automatic intervention of robots and remote piloted systems while respecting safety operations and personnel.
- Development of robotized equipment for larger interventions of maintenance or upgrading to be remotely controlled in non-routine circumstances avoiding disruption of other routine operations and increasing coordination between them and other involved agents.
- Proposals should foster the development and use of industrial-prefabricated infrastructures and modularising the planning, designing, and construction phases for retrofit projects using robotised equipment to perform automated construction or maintenance tasks.
- Possibilities for utilising V2I communication for capturing data and processing by AI for predictive maintenance should also be considered. New technologies, such as for instance AR and VR modelling, AI and drone technologies should be taken into account.
- Projects must consider a pilot demonstration in operational environment (minimum at TRL7 level). Testing and deployment on CEF corridors and possible synergies with CEF innovation projects is to be considered.

The Commission considers that proposals requesting a contribution from the EU for sub topic 2 (RIA) of between EUR 4 and 5 million each would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

1. Coordination and Support Action

- Improved environmental performance of Europe’s transport infrastructure and networks (e.g. reduction of habitats' fragmentation).
- Targeted research and deployment actions and efficient use of resources within a coherent innovation strategy.
- Strengthened lasting synergies between relevant national, regional (European) and international innovation programmes and initiatives.
• Widespread awareness of European efforts, as well as increased visibility of R&I outcomes and their contribution to improving environmental performance and biodiversity in a safe transport infrastructure network.

• Increased take-up of innovation outcomes by market, national authorities and relevant national platforms, while strengthening the alignment of innovation deployment of national infrastructure authorities in Europe.

2. Research and Innovation Action

• Reduction of fatal accidents due to maintenance works of road users and deployed personnel by 50%
• Reduction of traffic disruption due to maintenance works by 20%
• Reduction of routine maintenance costs by 20%
• Improvement of network capacity by 20%, based on the levels measured at the beginning for the project.

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

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

MG-2-12-2020: Improving road safety by effectively monitoring working patterns and overall fitness of drivers

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Specific Challenge: Driving is a complex activity. A hierarchy of skills is required for safe driving like operational (basic motor, sensory or perceptual), cognitive, tactical (choice of speed and distance from the other vehicles), and strategic (planning and preparing for long trips). Operational and sometimes cognitive skills typically decline for a variety of factors like ageing, chronic diseases, medication use, fatigue or a combination of these factors. The consequences of such decline on driver fitness are crucial for road safety and some countries already have procedures in place for assessing fitness to drive, nonetheless practical implementations and the assignment of responsibilities differ from country to country.

A driver’s fitness is also greatly affected by the consumption of psychoactive substances (illegal or not), which are incontrovertibly considered one of the major factors for traffic accidents. Establishing practical, reliable, specific and accurate tools for detecting those substances is of primary importance of the law enforcement authorities across EU, especially since their impact on road traffic accidents and associated injuries is undeniably important.

With the objective to further improve road safety, properly monitoring the driver’s fitness and physical state is an ongoing challenge that requires innovative techniques which go
beyond existing regulations (e.g Regulation (EC) No 561/2006 - “the 'Driving Time Regulation” or Regulation (EU) 165/2014 on tachographs in road transport).

**Scope:** Develop and test in at least 3 different sites innovative technological solutions for evaluating a driver’s fitness. These should include for example:

- Methods and practical solutions for evaluating driver’s performance and cognitive load, physical fatigue and reaction time. These solutions should go beyond the current state of the art and be suitable for roadside tests with particular focus on commercial drivers, whose working patterns could influence their driving performance. Transitional aspects with regard to automation should be considered and training actions for drivers should also be foreseen. **Sex and gender differences should be considered when relevant.** The proposed solutions should be interoperable and standardisation possibilities should be explored.

- Develop efficient, reliable, cost-effective and socially acceptable solutions for detecting impairing psychoactive substances (e.g. alcohol, prescription medicines, illicit or medicinal drugs etc) for which driving under their influence poses a road safety risk. The proposed drug screening devices should fulfil practical and scientific requirements and display at least 20% higher sensitivity (how often the test is positive when the condition of interest is present) and specificity (how often the test is negative when the condition of interest is absent) than the current state of the art.

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 to 3.5 million would allow this specific challenge to be addressed appropriately.

**Expected Impact:**

- Practical onsite or affordable screening devices that reliably measure the driver’s fitness and detect the existence of impairing substances.

- Countermeasures to combat driving impaired by medicines or excess fatigue.

- More consistent implementation across Member States of fitness to drive regulation and driver training, contributing to EU road safety targets.

- Standardised solutions for evaluating fitness to drive.

**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.*
MG-2-13-2020: Coordination and support for an integrated freight transport and logistics system

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**Specific Challenge:** Ensuring the seamless integration and harmonisation of transport modes is essential to achieve a truly integrated freight transport and logistics system, which on the one hand, is able to manage efficiently the physical, information and financial flows and on the other hand, support less impacting and environmental sustainable logistics operations. Speeding up technological and organisational innovation uptake and adoption will support freight transport decarbonisation and competitiveness. To this purpose, the assessment of progress, gaps and barriers is necessary. It is also key to involve and engage the end users of multimodal end-to-end freight transport chains, as they are both the recipients of innovation (autonomous transport, electrification, artificial intelligence, Internet of Things, blockchain, robotic systems, further digitalisation, new transport modes, etc.) and the key actors in charge of developing the business cases for new technologies uptake.

**Scope:** Proposals shall address all of the following areas:

- Perform a reasoned and detailed analysis of the products, services, solutions for business applications and other value added results generated by EU-funded projects (at the level of projects and/or cluster of projects), contributing to the achievement of EU policy objectives (e.g. zero city logistics emissions by 2030, zero logistics emissions by 2050, efficient free movement of goods and services) and a truly integrated transport system. This analysis should possibly cover projects funded since the 5th Framework Programme for Research. Building on previous mapping and benchmarking activities such as the SETRIS project and the pilot action on Implementation of Multimodal Innovative Solutions, evaluate e.g. the level of maturity of the products, services, solutions achieved within the projects and further development carried out beyond the projects, investigate which solutions have been implemented and adopted by the freight transport and logistics stakeholders and compare them with the state-of-the-art in the sector. Assess the barriers to the deployment of R&I results and propose solutions and actions to improve the framework conditions and overcome the identified barriers. Assess the impact of EU-funded R&I projects on various areas of freight transport and logistics (including urban logistics) by establishing possible causal links between public R&I funding and technology innovation in an area. Synergetic impact from regional/national programmes should also be considered. Examine in which areas EU funding had the highest impact, identify the framework conditions and actions which supported this outcome. Propose sectoral-specific impact Key Performance Indicators (KPIs) and recommendations to increase the research impact.

- Identify and prioritise gaps in the research landscape and market needs to be tackled by future R&I actions for an integrated freight transport and logistics system, also via a reasoned analysis of best practices and activities at relevant international level.

- Support the wider engagement of the freight transport and logistics stakeholders (reaching out to the ones less familiar with European R&I) in order to increase the
uptake of research outcomes and innovation by the logistics community at large. Develop an appropriate framework to foster collaboration and exchange of best practices in freight transport and logistics R&I at regional, national, European and global level.

- Engage with relevant sectors beyond freight transport and logistics to support cross-fertilisation and synergies within multidisciplinary projects (e.g. ICT, Circular Economy, Manufacturing and Supply Chain, Security).

The analysis will extend beyond the work carried out within the projects, clearly evaluating the project outcomes’ impact, as well as the framework conditions and activities which support high impact of public R&I funding. It will also establish possible causal links between public R&I funding and technology innovation in a specific logistics area. The analysis will be complemented by clear recommendations on future R&I activities to achieve an efficient and sustainable freight transport and logistics system.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 1 million would allow the specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. As the focus of this action is on analysing the impact of EU-funded R&I projects, at least 50% of the budget will have to be dedicated to the activities described under the first two bullet points.

**Expected Impact:** The action will contribute to achieve the EU policy objectives for freight transport and logistics (e.g. zero city logistics emissions by 2030, zero logistics emissions by 2050, fully integrated multimodal transport system, efficient and sustainable logistic and freight operations) by providing a reasoned and detailed mapping and assessment of the EU-funded R&I project outcomes.

The action will also support technological and organisational innovation uptake and a more efficient use of the available research resources by engaging the wider community of stakeholders, establishing collaboration between industrial stakeholders and the society at large, encouraging exchanges of best practices at regional, national, European and global level, and linking to relevant sectors beyond freight transport and logistics.

**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.*

**MG-2-14-2020: The effects of automation on the transport labour force, future working conditions and skills requirements**

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Specific Challenge: The European Commission has launched a number of initiatives, studies, workshops and conferences on the challenges and effects that digitalisation and automation in transport may have on the labour force, including on women and persons with disabilities. In road transport, studies and research projects are starting to assess on the future employment needs and the new set of skills required for automation. However, such aspects need to be further explored for all modes of transport (road, waterborne, aviation, rail), as well as in the context of urban transport, logistics and for new forms of work (for instance platform work in transport).

In particular, action is needed to ensure the preparation of a comprehensive, evidence-based, action-oriented, appropriate agenda to tackle the identified challenges. This would also require the investigation of gaps and barriers, which could potentially impede or neutralise any positive effects expected from automation. For this purpose, in order to successfully address this challenge, it is key to have a strong involvement and engagement of all relevant European stakeholders, including European, national and regional social partners (representing employers and workers) and EU Member States.

Attention should also be given to the collaboration with non-EU stakeholders where relevant, in order to solve common challenges, leverage resources, and establish long-term relationships.

Scope: Proposals shall address all of the following areas:

- Assess the impacts of automation and connectivity in all modes of transport on the labour market as a whole, focusing on both direct effects on the transport workforce and indirect / induced effects in other sectors.
- Review past/contemporary experiences from other automation-driven transitions to derive best practices in the transfer of lessons learned between different environments and social contexts.
- Review and analyse recommendations/contributions from past/ongoing related studies, activities and H2020 R&I projects. Identify and prioritise relevant targets and elaborate an action-oriented agenda aiming to achieve at least an overall neutral impact of automation at the level of the entire economy.
- Activate the wider engagement of the social partners and EU Member States in order to validate the agenda, as well as increase their participation and involvement in the implementation of identified actions. Develop an appropriate framework to foster collaboration and exchange of best practices at EU, national and regional level.
- Provide a forum for EU and international stakeholders (as appropriate) in this field to exchange experiences and knowledge on the effects of transport automation on the workforce and future skills and discuss future challenges. Organise conferences and workshops in this area.

Proposed actions should build on the knowledge and results of past and/or ongoing EU-funded projects (such as SKILLFUL), addressing the socio-economic impacts of automation in transport and/or undertaking related reviews of transport jobs and future skills requirements.
In line with the Union’s strategy for international cooperation in research and automation, international cooperation is encouraged. In particular, proposal should consider cooperation with projects or partners from Canada, Japan and the US.

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 and 2.5 million would allow the specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

- Demonstrate the expected impacts of automation and connectivity in all modes of transport on the labour market as a whole
- Inform, mobilise and engage all relevant European stakeholders, including the European, national and regional social partners and EU Member States, in an active dialogue on the socio-economic effects of automation on the present and future transportation workforce
- Minimise any potential negative effects of automation on the transport labour force
- Demonstrate the potential to achieve at least an overall neutral impact of automation for the entire society and economy.

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.

MG-3-6-2020: Towards sustainable urban air mobility

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Specific Challenge: Urban air mobility (UAM) is a field of disruptive innovation, not only for aviation but also for mobility systems and urban planning at large. At urban / suburban and peri-urban / inter-urban level, point-to-point air connection can help overcome the lack or congestion of surface transport, lighten and complement logistic chains whilst saving time and recurrent infrastructure costs.

The companies enabling urban air mobility and the cities and regions embracing it may develop competitive advantages, both in terms of manned/unmanned aircraft systems’ business and in terms of mobility services for people, emergency services and freight.

Innovation is at the core of the challenge to make urban air mobility not only safe, secure, quiet and green but also more accessible, faster, affordable, inclusive and publicly accepted. Research activities are not only aeronautical but also cross-disciplinary to enable aerial traffic in the urban environment. This will notably encompass more autonomous systems.
and efficient integration with urban infrastructure, with energy and communication networks and with other transport modes in a system-of-systems approach and in line with the Commission’s climate change Long Term Strategy.

**Scope:** Proposals should address novel concepts, technologies and solutions beyond the state-of-the-art. Proposals should address all the following three research areas:

A. Safety and security: particularly when operating over populated areas – including several aspects such as adverse weather and airflow conditions at low altitudes, human factors and automation, collision and avoidance; electro-magnetic compatibility; detection and surveillance of physical and cyber threats, prevention, preparedness, response and recovery from threats, including intentional interference and misuse of urban air mobility; and/or other relevant hazards and threats in an operation centric and risk-based approach.

B. Sustainability with regard to the overall environmental footprint (e.g. energy demand; local emissions and global greenhouse gas emissions); and sustainability with regard to noise and visual pollution, including those aspects dealing with perception, monitoring and mitigation in urban environments.

C. Public acceptance, socio-economic modelling and relevant regulatory and organisational aspects of urban air mobility systems, such as those evolving from noise, visual pollution, privacy, shared-use, land-use, liability, safety (including airworthiness) and security of operations (including enforcement), or dedicated certification schemes. Co-creation and involvement of citizens is key for this area e.g. to anticipate the behaviour, the blocking points, the needs and public tolerance/embracement for such a new mobility. Policy recommendations should also include procurement and deployment strategies.

In addition, the proposals will also have to address one or more of the following research areas:

D. Services: new door-to-door or emergency services concepts allowing UAM traffic to be embedded in multi-modal urban transportation environment; new approaches for regulatory due processes associated to the sign-off of urban air services.

E. Operations: new concepts of operations allowing UAM traffic to be interwoven with the multi-modal urban transportation or emergency systems (e.g. ground/air ambulances), with due account of the safe and secure utilisation of the air space.

F. Power-plant/propulsion system development for safe, economic and environmentally friendly UAM. Characteristics shall include high power/weight ratio, fast battery recharge/fuel-cell refill, high level of reliability and fail-safety and low level of noise, emissions and maintenance requirements.

G. Infrastructure adaptation, evolution and integration into transport, energy and ICT networks for efficient and seamless door-to-door mobility.
Particular emphasis should be addressed to potentially early urban air mobility services (e.g. for air medical emergencies, for safety & security services, for logistics, etc).

TRL can reach up to level 6 depending on the level of resources leveraged for the activities.

Proposals should ensure complementarities with the European U-space Demonstrator Network and with SESAR JU U-space activities. In addition to research and industrial involvement, proposals should ensure a strong commitment for collaboration and communication with local authorities and communities as well as with players from other relevant leading-edge industrial and service sectors that can substantially contribute to meet the challenges at stake. Proposals can leverage synergies with other EU activities such as:

- The European Innovation Partnership on Smart Cities and Communities (EIP-SCC), in particular the initiative on urban air mobility, and the CIVITAS initiative.
- The European Institute of Technology – Knowledge and Innovation Center (EIT-KIC) on Urban Mobility.
- EU satellite-based systems for navigation (EGNOS/Galileo), observation (Copernicus) and EU communication/connectivity initiatives (e.g. 5G, C-ITS).

The proposals may include the explicit commitment from the European Aviation Safety Agency (EASA) to assist or to participate in the actions. This is particularly important in view of the new EU drone regulation.

International cooperation is encouraged in cases of mutual benefit, such as sharing of practices with early adopters of urban air mobility in non-European megacities (e.g. Singapore, Dubai, Sao Paulo, Mexico DF, etc.)

The Commission considers that proposals requesting a contribution from the EU between EUR 4 and 6 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting lower amounts.

**Expected Impact:** The following impacts have to be addressed by all proposals:

- Contribute to smarter and more sustainable cities and air transport.
- Contribute to maintain aviation safety levels.
- Contribute to the development of European / international standards and legislation for urban air mobility.
- Contribute to increase the capability of public authorities – such as air regulators and urban planners – to handle the regulatory due processes for UAM services.
- Contribute to decrease the overall environmental footprint.

In addition, when relevant, the following impacts can also be addressed:
• Contribute to decrease the time in door-to-door travel or in case of emergency interventions.

• Contribute to reduce the lead time-to-market and de-risk the set-up of UAM services.

• Contribute to new urban planning tools to integrate UAM services in existing plans, in particular Sustainable Urban Mobility Plans (SUMP) and transport/logistics plans of individual institutions.

• Contribute to increase the competitiveness and economic growth, as congestion in cities is detrimental to business reactivity.

• Contribute to inspire and engage new generations of students, engineers and urban planners and mobility managers.

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.

MG-4-7-2020: Digitalisation of the transport system: data sharing

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Specific Challenge: A massive amount of data is already produced by the transport system and the trend is set to continue at an increasing pace. Optimal use of the available data is indispensable in order to advance towards an intelligent transport system that is efficient, reduces congestion, environmental impact and increases safety.

On the basic level, the challenge lies in ensuring that e.g. manufacturers, operators, or authorities can properly take advantage of the data produced for the improvement of their operations and services. Access to, reuse and storage of data is not only important for private companies active in the transport industry (business-to-business or B2B), but also for the public sector (business-to-government or B2G) for a more evidence-based decision making and a better public service delivery, such as transport safety or reduction of pollution from all transport modes or increased efficiency.

It is of key importance to develop a clear understanding of the areas where data exchange and digitalisation are required for improved system effectiveness. In these areas, data to be used in transport models need to be defined and harmonised.

On a more advanced level, in order to provide connectivity across the various components of the multimodal transport system, enable innovation and emergence of new business models, we need solutions for safe and secure collection, storage and sharing of transport data (both operational and research) across various actors and different transport modes.
Cloud based solutions could provide a high level of integration and accessibility of transportation data across the system and be used for variety of purposes, including research, development and innovation. However a number of challenges will have to be tackled before a successful wide scale implementation of cloud solutions for transport can take place, such as data privacy and security, standardisation and competitiveness issues, data interoperability and accessibility, governance, etc.

Scope: The proposals should cover all following aspects:

- Provide a comparative analysis of the transportation data regulation across all transport modes in the EU;
- Identify transport flows for which digitalised processes and transport data exchange will make most impact;
- Identify functional requirements and possible frameworks for data sharing across the transport system and with the public sector where appropriate – in particular through a federation of various cloud solutions (a Transport Cloud), taking into account the FAIR data principles as well as the private data sharing principles, including B2G and B2B data sharing;
- Building on existing standards / specifications that have been adopted by the EU or nationally e.g. DCAT-AP, propose standards for transport data sharing (including formatting, metadata descriptions, etc.) that would strike an appropriate balance between sharing data and proprietary rights. Proposals should clearly define the field of data, for which a standard shall be considered;
- Analyse the relationships between private and public stakeholders (on local, regional, national, EU and global level) and their differing approaches to data sharing principles;
- Examine the role of data sharing culture in the future development of any data sharing cloud based solutions, analyse methods that foster trust in transport data networks;
- Consider commercial and competitive risks of data sharing on an international scale as well as the potential for the EU to set global standards for data sharing;
- Identify main privacy and security issues associated to data sharing, including preventing data misuse;
- Identify appropriate governance structures and/or processes for the establishment of a possible Transport Cloud building as much as possible on the existing frameworks and initiatives.

Proposals should identify and build on the most relevant previously funded EU and national projects and reports such as Transforming Transport, BigDataEurope, NOESIS, LeMO, OPTIMUM, SELIS, AEOLIX, oneTRANSPORT, EfficienSea 2 etc. A structured method of building up on the achievements of the selected projects should be proposed. Proposals
should include an effective mix of private and public actors both from the transport and transport research domains.

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 and 3 million would allow the specific challenge to be addressed appropriately.

**Expected Impact:** The research will consolidate knowledge from the most important projects and initiatives implemented to date in the domain of transport data sharing. It will further build on that knowledge base by identifying new variables, requirements and standards necessary for a successful setting up data usage and sharing mechanisms in the transport sector (both passenger and freight).

Improved data sharing will help extract maximum value from the available transport big data, contribute to wider data sharing amongst the transport stakeholders, and lead to improved products and services. It will secure better understanding and opportunities for transport flow prediction and optimisation, which in turn will improve transport system effectiveness.

The outcomes of research will also lead to strengthening of the digital transport ecosystem by fostering the culture of trust and collaboration among the various stakeholders.

**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.**

**MG-4-8-2020: Advanced research methods and tools in support of transport/mobility researchers, planners and policy makers**

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**Specific Challenge:** Innovative solutions in the fields of connected and automated transport, shared mobility, inter-modality, etc. are being deployed or tested for wide-scale implementation, re-shaping mobility and affecting the operation and business models of the transport sector. These changes result in the emergence of new stakeholders and services, new types of data (in particular ‘Big Data’), new risks and socio-economic impacts.

The effective integration of disruptive technologies and solutions in the transport system, and policy design relies strongly on the capability to analyse, monitor and, assess mobility solutions and their potential socio-economic impact. However, current methodological tools, databases and models are not adapted to meet new research needs – including for electric mobility - resulting in growing knowledge gaps. In particular, many of the new knowledge needs require additional data, new data collection and management approaches, as well as new methods and tools to exploit the new types of data (in particular ‘Big Data’).
Scope: Proposals should address all of the following aspects:

- Identify major conceptual, methodological and technical needs for analysis, monitoring and assessment of new and emerging mobility trends and solutions.
- Examine how conventional concepts and variables such as, for example, efficiency, reliability, safety, comfort and security evolve with the new mobility concepts and the new societal and industrial structures to which the future transport network will provide services.
- Identify major new concepts and variables that play an increasingly important role in transport/mobility analysis, and devise methods to estimate/quantify them.
- Elaborate advanced methods and tools for monitoring, assessment and analysis of mobility solutions.
- Review and assess a range of options for collecting and using new data, through new data collection and management approaches, as well as new methods and tools to exploit data (such as, for example, ‘Big Data’), taking into account different type of variables such as gender, age, ethnicity, etc. when relevant.

Proposals can choose to focus either on passenger or logistics/freight sectors. Proposals should build on the latest state of the art in the research domain.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 and 2 million would allow the specific challenge to be addressed appropriately.

Expected Impact: Research will result in designing an up to date set of concepts, methods and tools that respond to the emerging disruptive technologies and solutions and that can be used in support of transport/mobility researchers, planners and policy makers. They will contribute to generating new knowledge and capabilities and serve for the purposes of effective implementation of innovative transport polices.

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.

MG-4-9-2020: The European mobility culture of tomorrow: Reinventing the wheel?

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Specific Challenge: Global warming and the need for CO2 reduction drives a search for new lower carbon ways of moving: old modes of transportation seem no longer sustainable in the long term. When thinking about the future of mobility, changes in mobility are usually addressed in terms of technology.

However, there is another – often neglected – aspect of mobility: the value it has in the present European culture, which legitimises today’s focus on speed and efficiency as main
performance indicators for development and growth. In parallel to developing new technologies, we also need to explore (an) alternative narrative(s) of mobility.

With a view to Horizon Europe, the next DG RTD Framework Programme, a forward looking exercise taking into account a new transport paradigm is needed to develop a coherent strategy for (near) future transport research with the aim to realising the COP 21 Paris Agreement and the global 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs).

Scope:

- Critically examine the criteria/objectives on which the actual mobility culture has been based. In a world engaged to reducing CO2emission, are criteria such as speed and efficiency still relevant? What can be the role of non-motorised transport modes, especially on short distance? Etc.

- Consider a future being shaped by changes in lifestyles, environmental and climate concerns (COP 21 and the SDGs), and the emergence of new values in order to better understand the mobility of the future, taking into account different type of variables such as gender, age, ethnicity, etc. when relevant. Propose (an) alternative mobility narrative(s) – well beyond the implicit assumption of useful mobility – with respect for the environmental boundaries of the planet and the wellbeing of the people.

- Develop a strategy for the transport policy of the future (passenger and freight), based on an alternative mobility narrative. Therefore launch a forward looking exercise and build scenarios with a roadmap for implementing this strategy. Develop a holistic and cross-sector policy approach, as required by COP 21 and the SDGs, to ensure that economic, social and environmental challenges are addressed together.

- Stimulate the creation of networks and structures with the main transport research and innovation stakeholders (public administrations, companies, universities, citizens, etc.) around which visions and strategies can emerge and converge.

The Commission considers that proposals requesting a contribution from the EU of between EUR 0.5 and 1 million would allow the specific challenge to be addressed appropriately.

Please note that this topic will take the form of lump sums as defined in Commission Decision C(2017)7151 of 27 October 2017. Details of the lump sum funding pilot scheme are published on the Funding & Tenders Portal together with the specific Model Grant Agreement for Lump Sums applicable.

Expected Impact:

- (A) new mobility culture(s) would have an important role in opening up new ideas and opportunities and in building strategies for the sustainable transport policy of the future.
A forward looking perspective on the European mobility culture of tomorrow would enable Horizon Europe to play a more strategic role in shaping and enabling a transformative transport (research) policy, working hand in hand with citizens and local communities.

The new mobility paradigm would contribute to building innovative ecosystems, which provide the supportive environments for the transformation process to flourish and be disseminated widely.

Type of Action: Research and Innovation action Lump Sum

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

MG-4-10-2020: Improving impact and broadening stakeholder engagement in support of transport research and innovation

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Specific Challenge: Increasing the impacts and broadening stakeholder engagement in support of transport research is an essential element to underpin the European added value from the Transport challenge of Horizon 2020.

One way to achieve this goal is to organise and participate in events that have major strategic importance.

An excellent example is the Transport Research Arena (TRA) organised in different Member States jointly with the Commission, whilst, amongst others, SMM Hamburg, the world’s largest Maritime Technology exhibition represents a valuable opportunity to broaden engagement in European Waterborne research and innovation.

Furthermore, additional targeted coordination and support activities are needed in the Inland Waterways sector and in particular with respect to the further development of the NAIADES actions and the leverage of the outcomes from related projects and to establish a bridge towards future research, innovation and implementation needs within inland waterways in coordination with the wider waterborne and logistics sectors.

Scope: To address this challenge, three sub topics are proposed and proposals should address only one of the following sub-topics:

1) Innovation awards for students and senior researchers in the context of the Transport Research Arena conference - TRA 2022
The action should focus on organising two competitions for transport research and innovation awards to be assigned at the TRA conference in 2022:

- A competition for students and young researchers with the goal of stimulating the interest among young researchers/students in the field of transport.
- A competition for senior researchers in the field of innovative transport concepts based on results from EU-funded projects only.

Both competitions should cover all transport modes and cross-cutting issues (technological, socio-economic and behavioural aspects) in line with the EU policy objectives for smart, green and integrated transport. The organisation of these awards should ensure high-quality competition and very good media coverage before, during and after the TRA conference. The action should give particular attention to gender issues.

The awards shall be widely promoted, including within press articles and via important trade publications. Particularly for the student award, wide pan European participation is expected and should be facilitated through engagement with relevant professional associations, their publications and other related student organisations.

2) Broadening Engagement and increasing impact from Waterborne transport research

The waterborne sector is highly fragmented, with diverse actors and administrative structures, covering ports, maritime and inland shipping. The resulting barriers inhibit innovation and the necessary R&I dialogue to maximise impact. To address this, the following activities should be foreseen:

- Together with Commission services and the broader waterborne sector, identify the information gaps concerning, innovation needs, awareness of outcomes and opportunities for participation and on this basis devise a communication strategy to be implemented over the course of the project.
- Develop KPIs and benchmark these at the outset and use to monitor progress throughout the project.
- Broaden lasting awareness and increase the impact from EU waterborne research through prominent participation within large strategic maritime and inland waterway events such as SMM Hamburg in 2022 and 2024 and for example promote waterborne innovation in overall strategic transport events, stakeholder exercises and the creation of durable engagement with potential public and private users.
- Produce high quality digital and printed dissemination materials concerning the scope and success stories arising from EU waterborne research. This should include a short video presenting the challenges, innovation needs and successes.

3) Towards an implementation of the future inland navigation action programme
The action should focus on consolidating the Inland Waterways Transport (IWT) knowledge network and partnership, which was previously established with the support of FP7. In this respect, it should ensure a solid knowledge basis for the implementation of any future NAIADIES programme. The coordination and support action will build on the results of previous work and will reflect the multi-disciplinary requirements and complexity of the subject, coordinating with the wider waterborne, land transport and logistics communities. The coordination action will be organised around the five NAIADIES 2 action areas, but will also take into account the results of the NAIADIES 2 progress report (adopted 18.09.2018) and other related activities. The coordination action will, in close cooperation with the European Commission, set up a roadmap for the implementation of actions not yet started or to be finalised and ensure the support to permanent-type of actions. It will identify the appropriate measures and define the necessary means and tools. In coordination with the Waterborne technology platform, the action will further develop a R&D roadmap by integrating all stakeholders and will also develop the implementation plan. Also in coordination with the Waterborne technology platform, the project will also monitor the inland navigation R&D projects and their impacts from relevant European programmes. The project will also identify barriers for the deployment of research results, market uptake and improvement of framework conditions to increase innovation in inland waterway transport. A particular focus will be to address the need to decarbonise and improve the environmental performance of inland waterway transport, particularly when operating close to urban areas, as well as on future-proof infrastructure, compatible with digital and automation developments under a changing climate.

This coordination and support action will ensure an active participation of key industrial stakeholders, the Waterborne Technology Platform, Member States administrations, industry associations and river commissions.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 0.7 million for sub-topic 1); of up to EUR 1.3 million for sub topic 2) and of up to EUR 2 million for sub topic 3) would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

- **Contribute to a wide dissemination of the results of European transport research, broaden stakeholder engagement and raise the visibility and weight of the EU policy in the field.**

- **Increase the attractiveness of transport related studies and reinforce the pursuit of excellence and impact in European transport research and innovation, by giving recognition and visibility to the best achievements.**

- **Creating links and exchanges between research and innovation stakeholders and policy makers, thus improving the development and deployment of innovative solutions for transport in Europe.**
• Increase the impacts and take up of the outcomes from EU research and innovation and broaden engagement beyond those already familiar with EU research programmes.

• Promotion and development of the inland waterway sector: increasing awareness so as to increase usage of Inland waterway transport. Identify best practices and increase their take up and faster modernisation of the inland fleet. Provide a knowledge exchange, discussion and promotion platform; strengthen the coordination between national, EU and industrial research across waterborne transport and the wider logistics chain. Working together with the waterborne platform, assist in assessing current/future EU R&I programmes, implementation actions, technology assessments, forecasts and transfer of R&I solutions. Improve the environmental performance of inland waterways and contribute to future-proof infrastructure, compatible with digital and automation developments under a changing climate.

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.

Call - 2018-2020 Digitising and Transforming European Industry and Services: Automated Road Transport

DT-ART-06-2020: Large-scale, cross-border demonstration of connected and highly automated driving functions for passenger cars

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Specific Challenge: Significant progress has been made in developing technologies for connected and automated driving in Europe and many large-scale demonstration projects are already ongoing. Automated driving functions for passenger cars at SAE Level 3, such as Traffic Jam Chauffeur or Highway Chauffeur, are expected to be introduced into the market from 2020 onwards.

However, several challenges remain, in particular for highly automated vehicles, before we will see them on the roads. Highly automated vehicles must achieve very high levels of availability and effectiveness of the vehicle functions and their performance has to be better compared to the performance of human drivers. Based on ongoing demonstration pilots, new large scale, cross-border corridor projects for highly automated driving systems are needed to ensure that no new risks are introduced and to study user and customer expectations and acceptance, market potentials and risks.
**Scope:** The proposed actions should include all the following aspects:

- Demonstrate the robustness and reliability (functional safety) and user acceptance of connected and highly automated driving technologies and systems for passenger cars (SAE level 4) for different use cases in particularly challenging and complex environments that are expected to be introduced into the market after 2020.

- Test innovative connectivity technologies for connected and automated driving since communication and cooperation of automated vehicles with other vehicles, infrastructure and other road users has the potential to increase the safety, comfort, productivity and the enabling of innovative business models of automated vehicles and to improve the efficiency of the overall transport system.

- The use of the European Global Navigation Satellite Systems (Galileo and EGNOS) should be encouraged to achieve the full potential of advanced satellite positioning for automated driving functions.

- Optimised use of digital technologies such as the Internet of Things, Artificial Intelligence and Big Data for automation should be considered.

- Conduct cross-border demonstrations to ensure that new services and systems are compatible and interoperable at European level, to optimise the use of digital technologies for automation between countries, to coordinate investments towards reliable communication coverage and to exploit the full potential of hybrid communications between short-range and long-range technologies and technologies within the 5.9 GHz spectrum band.

- Develop and test solutions for smooth communication and interaction between automated vehicles and their users and other (vulnerable) road users, taking into account gender differences, when relevant.

- Holistic concept for cybersecurity to protect automated driving systems (and its connectivity points) to avoid any (conscious) manipulations of the information enabling automated driving functions and to assure confidentiality, availability and integrity of data. This concept should also include the protection of the information collected by the automated vehicles and the external data transferred to the vehicles. Provide support to the development of testing and validation procedures of connected and automated driving functions, including their performance related to cyber-security.

- Evaluate effects of connected, cooperative and highly automated driving systems on transport system efficiency, safety, security, environment as well as on user behaviour and user acceptance, taking into account gender differences and other intersectionalities, when relevant.

**Lessons learned (data, knowledge and experiences from the project, including disengagements and edge cases) should be provided. Consortia should commit to make the data collected during the pilots available through common data sharing frameworks in order to foster further research.**
In line with the Union’s strategy for international cooperation in research and innovation, international cooperation is encouraged. In particular, proposals should foresee cooperation with projects or partners from the US, Japan, South Korea, Singapore, and/or Australia. Proposals should foresee twinning with entities participating in projects funded by US DOT to exchange knowledge and experience and exploit synergies. Twinning with Japan is also encouraged.

The Commission considers that proposals requesting a contribution from the EU between EUR 15 and 30 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: Actions are expected to demonstrate at large-scale the technological readiness, reliability and safety of the connected and highly automated driving functions for different use cases in particularly challenging and complex environments. They will show that highly automated driving systems for passenger vehicles can increase road safety and transport efficiency, reduce energy use, pollutant emissions and traffic congestions, and therefore support climate action and sustainable development objectives. Better protection of connected and automated vehicles against any type of cyber threats to guarantee safe operations. Actions will seek to improve user acceptance of innovative connected and highly automated driving systems and the uptake of new business models. They will contribute to a better understanding of viable business and operating models that could lead to private and/or public private investments in communication infrastructure.

Type of Action: Innovation action

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*
Societal Challenge 5: Climate action, environment, resource efficiency and raw materials

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

LC-CLA-10-2020: Scientific support to designing mitigation pathways and policies

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Specific Challenge: The early 2020s will be an important period for EU climate action. In the context of the Paris Agreement, all Parties including the EU were invited to submit by 2020 both an update of the Nationally Determined Contributions (NDCs) regarding short term actions up to 2030 as well as long-term greenhouse gas emission development strategies up to 2050. These strategies are expected to underpin the EU’s commitment to the Paris Agreement to limit global warming to well below 2°C and to pursue efforts to keep it below 1.5°C. They will also address the need to reach carbon neutrality by mid-century, as highlighted by the recent IPCC Special Report on 1.5°C. Achieving the Paris climate goals and EU commitments will also depend on individuals, households and communities, who should systematically choose low-carbon options in their daily consumption, lifestyle and investment decisions. Effective communication on climate change and demand-side measures will be instrumental for active engagement of citizens. A reliable policy framework is needed for business and consumers enabling low-carbon consumption, lifestyle and investment decisions. Furthermore, the EU does not act in isolation and cannot achieve the Paris Agreement goals by its own mitigation efforts. Also other countries will be preparing for their next steps related to the development of new NDCs. Achieving the goals of the Paris Agreement will require a very significant increase of ambition and swift implementation at the global scale. Actions under this topic should provide scientific evidence, analysis and support for these processes and reinforce the link between the latest climate science, mitigation pathways and underlying policies.

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

a) Assessing and designing climate policies for the coming decade:

Actions should analyse what contributed to the delivery on the 2020 energy and climate policy targets, based on available European and national data and outcomes, with special regard to, inter alia, policy implementation, low-carbon investment flows, industrial innovation, the energy- land-use nexus, economic and environmental impact, and technology development and diffusion, as well as consequences for the post-2020 period. In the context of the EU's 2030 energy and climate targets and in view of providing scientific support to the design of post-2030 climate policies, actions should also analyse the needed evolution of the mitigation, adaptation and innovation policy mix at all relevant scales, including their innovative financing, the associated macro-economic and sector-level impact, including on productivity, competitiveness, environment, health and employment; the required investment flows for zero carbon solutions; the relevant socio-technical transition processes, as well as the interaction between near- to mid-term action, and long-term mitigation pathways. Finally, actions should involve relevant (private and public) stakeholders to enhance further their policy-relevance.
b) Decarbonisation and lifestyle changes:
Citizen engagement in climate action will be indispensable for delivering on the Paris Agreement goals, therefore identifying critical areas of individual level action, relevant structural changes and means to incentivise them are key. Accordingly, actions should identify and analyse the role of individuals (including gender aspects), households and communities in the socio-technical transition, critical areas of lifestyle change, and associated social innovation processes that are needed globally and in Europe to be in phase with low-carbon emission pathways. The analysis should consider, inter alia, the economic and climate impact of shifting lifestyle and consumption patterns, and the health co-benefits of action, as well as the risks of unintended consequences (e.g. rebound effects). Actions should also explore how citizen and household level changes can be incentivised and analyse enablers for and barriers to public engagement and acceptance. Actions may also explore possible policies and communication strategies on climate action where appropriate in conjunction with health co-benefits in order to engage citizens and stakeholders from relevant economic sectors and develop concrete recommendations. Already existing low-carbon lifestyles within intentional communities like eco villages, transition towns, slow food, slow city movements or car-free living maybe investigated in terms of what hampers their action despite high motivation and what can be learned for up-scaling or duplicating low-carbon practices. Finally, actions may explore citizen science activities as a way to engage and educate citizens on climate action.

c) Science underpinning the preparations of NDCs after the 2023 Global Stocktake at a global scale:
Following the 2018 Talanoa Dialogue which examined countries collective progress in global climate action, the next milestones of global climate governance will be the 2023 Global Stocktake and the preparation of new NDCs for the period beyond 2030, which for most countries have to be submitted by 2025. The need for adequate scientific capacities at national and subnational levels – and going beyond major economies – remains considerable. Actions should provide state-of-the-art evidence to policymakers during this crucial time. In particular, they should: contribute to the evidence base supporting countries efforts to finalise NDCs in 2024 following the Global Stocktake at the end of 2023 by i) reviewing the process of the development of existing NDCs including if and how policies were implemented by 2023 to achieve these NDCs, ii) providing scientific information on the options available for preparing post-2030 NDCs compatible with the goals of the Paris Agreement (mid- and long-term action) and latest climate science, within the context of multiple economic and sustainable development priorities and iii) demonstrating through quantitative modelling techniques how scientific findings such as those assessed in the IPCC can be translated into viable policies and long-term decarbonisation pathways at regional and national levels. Furthermore, actions should provide insights concerning the risks related to stranded assets, as well as possible interactions with policies targeting the achievement of the Sustainable Development Goals. Actions should also assess to what extent, next to national action in the context of NDCs, international bunker fuels can contribute to achieve the Paris Agreement’s mitigation goals, and what the risks are for double counting efforts between sectors.

Proposals for all sub-topics are encouraged to extend their analysis to some major emitters outside Europe and to selected less-developed countries.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 3-5 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:

- providing measurable support to the EU’s long term strategy on greenhouse gas emission reductions;
• providing national and global pathways towards the Paris Agreement’s global temperature goal and insights into how these can inform countries’ next NDCs.

• supporting the Stocktake Exercise by taking stock of collective progress towards the Paris Agreement goals and investigating how progress can be accelerated;

• demonstrating how the latest climate science (including the 6th Assessment Report of the IPCC) can be converted into practical advice for national mitigation action;

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-11-2020: Innovative nature-based solutions for carbon neutral cities and improved air quality

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Specific Challenge: Emissions of pollutants in air are a major concern worldwide, due to its direct consequence on human health, as well as its additional impacts on climate. In the EU, air pollution is estimated to cause 400,000 premature deaths per year, with cities producing more than 70% of greenhouse gases world-wide. Urban citizens, due to the concentration of population and sources of pollution in densely populated areas, are particularly vulnerable. Actions aimed at air quality improvement contribute, in many cases, also to reduction of GHG and other airborne pollutants emissions. Nature-based solutions based on the creation, enhancement, or restoration of ecosystems, including soils and green infrastructure, in cities can improve air quality and regulate GHG in the atmosphere, both directly through the removal of air pollutants and carbon storage and sequestration and indirectly by reducing energy needs and pollutants emissions through natural cooling and active mobility. In doing so, they also deliver multiple benefits related to different policy targets, for instance, health and wellbeing, biodiversity, urban regeneration, water, storm water and/or wastewater management and climate adaptation/mitigation. However, the opportunities offered by nature-based solutions to tackling air quality and GHG mitigation in cities depend on complex, highly context dependent processes and interlinkages. Furthermore, the contribution of these solutions in addressing the air and carbon challenge in cities, in tandem with other urban challenges as a result from their multiple services, is neither well understood, nor measured and assessed. Filling these knowledge and evidence gaps will make a strong case for wide deployment of such solutions.

Scope: Actions should assess the direct and indirect contribution of nature-based solutions in diverse structures and configurations (e.g. mix of vegetation and trees, species, shape, spatial distribution of public green space and vegetation coverage) to combatting air pollution, reducing allergy potential of urban environment and mitigating GHG and other airborne pollutants emissions in cities including under future climate change scenarios.
Actions should recommend optimal solutions and appropriate typologies fitting to different contexts in terms of different climatic, environmental and socio-economic conditions and different urban designs. Benefits and co-benefits (including citizens’ health and well-being, biodiversity and climate change adaptation), synergies (including impacts on social inequalities) and trade-off delivered by the deployed solutions must be evaluated. Tools, models, design guidelines, standards and protocols to integrate these solutions into local decision making and socio-economic transition pathways, including in spatial planning should be developed and validated.

Actions should enable the continuous monitoring of air pollution and atmospheric carbon concentration and thus contribute to improvement of relevant modelling capacity, deploying indicators enabling easy assessment, communication, 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 in particular the Copernicus Atmosphere Monitoring Service and the Climate Change Service with their value-added products and information) and GEOSS, satellite navigation and positioning services offered by EGNOS/Galileo, and citizens’ observatories.

Actions should test innovative governance, business and finance models promoting participatory co-creation processes in developing, implementing and assessing impact of these solutions and taking into account interdependency with the city’s hinterland and with others air quality mitigation measures.

Furthermore, to secure the widest possible accessibility of the generated data and knowledge for effective communication, public consultation, and exchange of experiences, the funded projects must upload their final data on established networks and information sharing mechanisms at European scale such as Oppla, the European Environment Agency (EEA) air pollution data centre and Climate-ADAPT.

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

To enhance the impact and promote upscaling and replication of these solutions, actions should account for conditions and mechanisms for how the intervention, as part of the project proposed, works in delivering the desired outcomes to enhance our knowledge about the causal factors for how interventions work in context.

Furthermore, actions should engage in substantial networking and training activities to disseminate and exchange 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 Covenant of Mayors - Europe (supported by the EC) should be sought where appropriate. Actions should envisage clustering activities with other relevant ongoing and future nature-based solutions and relevant citizen observatories projects funded under previous and current H2020 Work Programmes for cross-project co-operation, consultations and joint activities on cross-cutting issues and share of results as well as participating in joint meetings and communication events. To this end, proposals should foresee a dedicated work package and /or task and earmark the appropriate resources accordingly. They should make use and contribute to knowledge exchange and networking European platforms (e.g. Climate-ADAPT, ThinkNature, OPPLA). Action should take advantage of data and information provided by the Copernicus programme.
Proposals should pay attention to the special call conditions for this topic. In grants awarded under this topic, costs for construction and installation of “infrastructure-targeted” interventions shall not constitute more than 20% of the total 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.

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:

- in the mid-term, the creation of an European reference framework and the establishment of EU leadership in a new global market (supply and demand) for nature-based solutions, new economic opportunities, new products, services, protocols and standards, planning approaches and methods, leverage of investments, reduced regulative and administrative barriers, and new local green jobs;

- increased evidence and awareness of the benefits of re-naturing cities for combatting air pollution and mitigating climate change and for improving health, well-being and resilience to the impacts of climate change;

- creation of ‘communities of practice’, more effective policy making and better informed decision making across Europe, based on an EU-wide evidence base regarding efficacy, efficiency, cost-benefiting and comparative advantages of a range of tested, well documented, up-scalable and marketable nature-based solutions;

- enhanced stakeholder and citizen ownership of the solutions through their effective and systematic involvement in co-creation processes for the development, implementation, monitoring and testing of the solutions and their integration in sustainable urban planning and design;

- enhanced implementation of relevant EU air quality regulations and environmental policies and programmes, such as the EU Water Framework Directive, the 7th Environment Action Programme, the Urban Agenda for the EU, the Clean Air Programme, the EU Biodiversity Strategy, the EU Climate Change Adaptation Strategy and the conclusions of the COP21 Paris Agreement, and the 'Communication on Green Infrastructures', and of the Sustainable Development Goals (SDGs) – in particular SDG 11 'Make cities and human settlements inclusive, safe, resilient and sustainable'.

Type of Action: Innovation action

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*
**LC-CLA-12-2020: Advancing climate services**

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<th>SwafS Key Word(s)</th>
<th>Citizen Science, Public Engagement</th>
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**Specific Challenge:** Under the Paris Agreement it was agreed to enhance adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response. It was also recognised that there is a need to enhance action on adaptation with regard to strengthening scientific knowledge on climate, including research, systematic observation of the climate system and early warning systems, in a manner that informs climate services and supports decision-making, including the socio-economic analysis of adaptation options for key impact areas. Recent advances have led to the creation of very large amounts of climate data. It is important that we are able to use said data (in particular data provided by the Copernicus programme) and create services that communicate and deliver bespoke critical climate information to better inform risk-aware decision making and adaptation strategies.

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

a) **Mapping European coastal infrastructure at risk from sea-level rise:**
Actions should undertake a new high-resolution mapping of predictions of future sea levels against European coastal elevation and identify risks to relevant coastal infrastructure. Actions should deliver an *engaging, interactive and authoritative map* of the European coastal zone perceived to be at risk of inundation due to future predicted changes in relative sea levels. Actions should also include low-probability high-impact scenarios and account for local, regional and global processes driving changes in coastal elevation. Actions may further consider the impact of adaptation measures (e.g. barriers) that are already in place and projected impacts on population displacements. Cooperation with projects under topic LC-CLA-13-2020 and other relevant on-going Horizon 2020 projects is encouraged.

b) **Detection and attribution of extreme events using Artificial Intelligence:**
Actions should explore novel approaches for detection and localisation of extreme events, including tropical cyclones and heat waves, and for quantifying extreme events trends in current day and future climate change scenarios. Actions should develop artificial intelligence techniques (e.g., deep learning) to detect spatial and temporal patterns and evolutions of climatological fields (e.g., temperature) associated with extreme events. These techniques should be capable of discriminating between different variables based on the event type and capable of handling events at various spatial scales. Particular consideration should also be given to associated impacts and attribution to climate change. Where appropriate, actions should take advantage of data provided by the Copernicus programme.

c) **Impacts of overshooting:**
Understanding how rising global temperature translates to impacts for society and natural ecosystems is critical in order to prepare for, and strive to reduce, the magnitude of climate change. While global temperature is a good indicator of global change, local impacts can be much more pronounced. Actions should assess and report on the impacts associated with overshooting temperature goals set by the Paris Agreement. Actions should highlight regional differences in associated impacts and identify possible adaptation measures and solutions.
The Commission considers that proposals requesting a contribution from the EU in the range of EUR 4-6 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. For the evaluation procedure, the following provision applies: at least one proposal per sub-topic will be funded, provided it passed all thresholds.

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

- enhanced adaptive capacity;
- reduced vulnerability to climate change;
- enhanced action on adaptation;
- strengthened scientific knowledge on climate;
- better informed climate services and decision-making.

**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-13-2020: Climate resilience of European coastal cities and settlements**

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**Specific Challenge:** Extreme high coastal water levels have increased at most locations along the European coastline. This increase appears to be predominantly due to increases in baseline mean local sea level rather than to changes in storm activity (IPCC 5th Assessment Report). According to recent studies, a 30 cm sea level rise by the end of the 21st century, in the absence of adaptation measures, would more than triple annual damages from coastal floods in the EU, from EUR 5 to 17 billion. Robust adaptation measures need to be undertaken in coastal and low-lying areas to protect them from increasing climate and sea level rise risks, including coastal erosion. Uncertainty of regional and local projections and lack of sustainable finance, public-private cooperation and knowledge and evidence-base have prevented authorities to take appropriate actions to prevent or mitigate coastal disasters. Filling these knowledge and innovation gaps will allow for the design and implementation of long term adaptation planning and cost-effective measures within an integrated coastal zone management (ICZM) framework to enhance the overall resilience of coastal cities and settlements.

**Scope:** Actions should capitalise on past and current initiatives and knowledge including associated uncertainty, to improve the integrated spatial planning, management and adaptation of Europe’s coastal cities and settlements. They should provide scientific insight, tools, methodologies and innovative solutions to assist European coastal cities in developing their own coastal resilience plans and management and dynamic adaptation pathways (i.e. protect, accommodate, or retreat options), at spatial and temporal scales most relevant to their specific needs and context, to address the risks.
associated to climate change with emphasis to exposure to sea-level rise, while understanding the cascading effects and impacts on other sectors (e.g. water, energy, food, land use, etc.). Actions should use state-of-the-art predictions of the rate and extent of sea-level changes on time scales of years to decades to identify urban coastal areas at risk of flooding and erosion. The assessment and mapping of coastal exposure and vulnerability to sea-level rise should also consider low probability high impact scenarios (H++). Proposals should make use of existing Coastal Risk Assessment Frameworks, including socio-economic considerations, and informative tools for multi-hazard assessment.

As part of the proposed work, actions should develop a methodology for a thorough assessment of the robustness and effectiveness of protective structures measures and governance structures. They should come up with sound methodologies and guidance for the elaboration of resilience plans for vulnerable urban areas implementing, as appropriate, ecosystem-based approaches (e.g., Nature-Based Solutions, landscape planning) along with hybrid and traditional engineering approaches as part of a broader strategy. This includes the design of monitoring plans to detect signals for implementation and/or reassessment of the coastal plan. On the basis of an in-depth literature review and additional studies as appropriate, comparison of economic, social, cultural and environmental impacts (e.g. costs and benefits) of ecosystem-based approaches with the ones of traditional technical approaches should be undertaken, considering security aspects, cost-effectiveness, adaptability to changes and avoidance of undesirable lock-in effects. Actions should develop tools, methodologies and guidelines to assist decision making in selecting optimal mix of protection measures (ecosystem-based, hybrid, and traditional engineering) enhancing resilience for the diverse coastal contexts in Europe.

Action may include pilot studies comprising "front-runner" cities and territories advanced in the elaboration and implementation of coastal adaptation and resilience plans mentoring "follower" cities not so advanced in this process to enhance the potential for replication and up-taking of the outcomes and hence impact of the action.

Actions should envisage clustering activities with other relevant ongoing and future actions (e.g., LC-CLA-12-2020), relevant projects funded under previous and current H2020 Work Programmes for cross-projects co-operation, consultations and joint activities on cross-cutting issues and share of results as well as participating in joint meetings and communication events. To this end, proposals should foresee a dedicated work package and /or task and earmark the appropriate resources accordingly. They should make use and contribute to knowledge exchange and networking European platforms (e.g. Climate-ADAPT, ThinkNature, OPPLA).

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:

- improved decision-making on suitable adaptation options and coastal management strategies, in view of demographic, water supply, climate and land use changes on the basis of adaptation measures for specific local vulnerabilities, urban contexts and sectors in Europe and an assessment of coastal ecosystem services, adaptation costs and benefits;

- strengthened coastal adaptation network between scientists, engineers, policy-makers, stakeholders and the general public;

- improved integrated spatial management and adaptation of Europe's coastlines;
SwafS Opportunities

- the implementation of the Marine Strategy Framework Directive, the Water Framework Directive, the Flood Directive, the Natura and Habitats Directives and the Biodiversity Strategy, and EU Climate Change Adaptation Strategy;

- underpinning of Integrated Coastal Zone Management and multi-level governance.

**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-23-2020: Towards a comprehensive European mountain research strategy**

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**Specific Challenge:** European mountain regions play a central role for the well-being of many highly populated European regions for instance for water and energy supply, weather regimes, recreation and tourism. European mountain regions are home to a high degree of biodiversity, including many endemic species that occur nowhere else. However, mountain regions are expected to react far more sensitively to global change than other parts of the world. Therefore, research on sustainability of these regions is important not only for the population living there and the many tourists visiting them (e.g. 150 Millions/year for the Alps) but for a significant part of Europe’s population. European countries operate excellent research infrastructures in mountain regions and are leading in many fields concerning climate, ecosystems, life in extreme environments, pollution monitoring and other aspects. Making the most efficient use of these resources and the latest scientific developments for addressing the abovementioned challenges, while contributing to climate change mitigation efforts targeted at this specific ecosystem, requires a high degree of coordination within Europe and beyond. Hence, a prominent challenge for this topic is to support and coordinate research and innovation to advance the understanding of current changes in mountain areas derived from climate changes, the synergies with other human–related forcing, the prediction of potential changes in these regions, and to foster observations for a sound monitoring of the regions.

**Scope:** The action should coordinate and support mountain regions research in Europe and develop a comprehensive European Mountain Research Strategy building on existing European activities. This strategy should aim to support the development of services necessary for the adaption to climate change and the improvement and extension of observations, in particular in-situ ones, for the monitoring of the mountain regions. In line with Responsible Research and Innovation (RRI), citizens, civil society organisations and other relevant stakeholders should be involved in the co-design of the research strategy. This initiative strives for enhanced coordination with international research organisations and programmes related to mountain regions research (e.g. WMO, ESA, GEO, NEMOR and JPI 'Climate') as well as with relevant operational services including Copernicus. This action should support the implementation of the EU Strategy for the Alpine Region – EUSALP (https://www.alpine-region.eu/) and the GEO global Network for Observation and information in Mountain Environment – GEO-GNOME (http://earthobservations.org/geoss_wp.php), and take advantage of other regional and thematic networks initiatives that are being developed in Europe.
In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged, in particular with countries such as Canada, China, India, Russia, United States, and Latin American countries.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 1.5 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:

- substantially raising the scale and ambition of inter-disciplinary mountain regions research policy in Europe;
- improved coherent and efficient use of European resources for mountain research;
- significant extension of the Copernicus and EuroGEOSS services and products to the mountain regions;
- step change in the domain of open data access, quality control and interoperability for mountain region monitoring and adapting to climate change.

**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.*

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

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**Specific Challenge:** Water, energy and food are essential for human well-being, poverty reduction and sustainable development. Projections suggest that the demand for freshwater, energy and food will be on the rise due to, amongst other factors, demographic changes, economic development, and international trade. This puts in jeopardy the availability of these resources for different uses. Climate change exacerbates water demands, putting additional pressures on water availability and quality, including biodiversity, while at the same time causing extreme events (floods/droughts) that have severe socioeconomic and environmental consequences. Actions to mitigate and adapt to climate change and variability can have strong implications for the surface and ground water system and its users, for example, when fossil fuels are replaced by hydropower or biofuels. Moreover, changes in energy usage and types of energy production affect water usage and impact agricultural production. All these pressures result in conflicts in allocation of water and between the water – energy – food sectors, which causes additional concerns for the sustainable management of surface and ground water bodies, especially the transboundary ones, where a very large proportion of world's population is living. However, despite this, the strong linkages between water, climate,
energy and food are seldom understood and rarely incorporated in the development of national and regional water, food and energy security policies or climate policies. Therefore there is a need to better align water-related or water-dependent policies looking in a systemic way from the natural climate-water-energy-food nexus perspective at various geographical scales, and taking into account economic, political and societal aspects.

**Scope:** The objective of this action is to develop and test innovative solutions, improved operations and integrated management and planning for achieving water, energy and food security and safety within the planetary boundaries and resolve conflicts between upstream and downstream water users and citizens. Proposals should assess the interlinkages and interdependencies of water, food and energy sectors and ecosystems in different water bodies, in particular transboundary ones. Climatic, environmental, land-use, social and economic trends and governance regimes in the water and these interlinked sectors should be also considered.

Proposals should also identify, develop, demonstrate and test innovative, multi-beneficial solutions that can best deliver good water status, in terms of quantity and quality, sustainable food and energy security, enhance human wellbeing and resolve conflicts between different users and different sectors. New integrated policies, governance mechanisms, learning and communication tools that can deliver good water status, sustainable food and energy security, taking into consideration the trade-offs between the 3 sectors, should be also developed. Sustainability criteria to be considered include full climate-change mitigation effects based on full carbon accounts, impacts on biodiversity and ecosystems, conservation of fertile soils and other biophysical impacts along with socioeconomic equity and justice criteria.

Mechanisms and tools that support common evidence, build and enhance trust between the different stakeholders and allow them to jointly address the trade-offs and identify win-win strategies, should be also addressed. This could include innovative monitoring schemes, demand forecasting, socio-economic assessments, scenario planning, behavioural change (including a gender analysis, when relevant), using social science approaches and financial levers to implement a real water-energy-food nexus approach and increase efficiencies, equity and sustainability.

This action should also address climate impacts on integrated water management, that is, implications for drought risk, water scarcity, drinking water availability and quality, food production and energy production and how the vulnerability of water resources can be reduced. Case studies over different geographical regions and challenges to facilitate tailored analyses and test the developed solutions should be considered. Actions to generate and analyse the relevant data required to assess the nexus interlinkages and trade-offs and ensure their long-term availability in the context of relevant EU data infrastructures should be also considered.

**Participation of a broad range of different stakeholders around water, energy and food security strategies, including policy makers will be essential.**

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged. Proposals should avoid duplication with ongoing EU funded research and innovation actions, while strengthening potential synergies. Activities are expected to achieve TLR 5 by the end of the project.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 4-5 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:

- more accurate evaluations of future demands for water, energy, food and related infrastructures at both local and global scales, taking also into consideration the ecosystem needs

- enhance sharing knowledge and best practices in climate-water-energy-food nexus assessment and management and help create critical mass on capacity to innovate;

- improve integrated water resources management and increase resilience to climate change, considering the value of water for ecosystems and their services and ensuring good quantitative and qualitative status of water, sustainable agriculture, food and energy production, as well as water, food and energy security;

- help linking EU water policy objectives with the sustainable objectives of greening the CAP and ensuring sustainability and quality of water resources and resource and energy efficiency policy objectives, achieving for instance, zero energy and minimal water use for renewable energy extraction from water, and net zero carbon emissions by 2050 to hit a 1.5-degree warming target, enabling the combination of water and energy efficiency;

- assess the impacts of EU regulatory framework (e.g. Renewable Energy Directive) on a sustainable water-energy-food nexus;

- reduce institutional fragmentation whilst increase cross water, energy, food collaboration and inclusive multi-stakeholder engagement;

- reduce the water risks for the energy sector and optimise market and trade solutions across the nexus;

- strengthen EU role in international water issues, and become a leading actor on water diplomacy.

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-15-2020: Forest Fires risk reduction: towards an integrated fire management approach in the E.U

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<th>Gender Equality, Open Access/Open Data, Public Engagement, Responsible Research and Innovation (RRI), Science Communication</th>
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Specific Challenge: Forest fires are a major hazard in Mediterranean Europe and increasingly so in Central, Eastern and Northern European countries. There is a limit in our capacity to deter fires, particularly mega-fires when conditions are most severe. This is the result of unbalanced
management strategies and policies that can be effective in fire suppression under normal weather conditions but are insufficient to deal with extreme events such as mega-fires. Areas at risk from forest fires are projected to increase by 200% in Europe by the end of the 21st century, in particular due to climate change. Moreover, the development of urban areas in the vicinity of forest areas combined with a lack of risk awareness will increase the exposure and vulnerability of local communities. This new context calls for more effective science-based fire management and risk-informed decision-making, which takes into account the socio-economic, climate and environmental roots of forest fires. Improving fire management and governance therefore implies shifting the focus from fire suppression to fire prevention, increasing the awareness and preparedness of people at risk, and developing more balanced and long term forest management strategies that integrate fire prevention with forestry and land management (including conservation of habitats structures, resources and diversity), rural development, urban development, climate and energy policy objectives. An integrated fire management strategy is necessary to ensure that wildfires risks are managed in such a way that people and housing safety, economic growth, well-being, carbon sinks, biodiversity and ecosystem services are maintained or increased.

**Scope:** Actions should generate the knowledge, tools, capacity and guidance to underpin an Integrated Fire Management strategy that promotes holistic landscape, land use, and forest management and considers the interaction among all phases of the wildfire management process (i.e. fire prevention and preparedness, fire detection and response, post-fire restoration and adaptation).

Proposals should assess the changes in fire regimes under various climate, vegetation and land use change scenarios, including settlement/housing development/infrastructure and rural-urban interface, with particular focus on ignition and fuel patterns, spatial and temporal dimensions of fire activity, including the expansion of the fire-prone area in Europe. Understanding extreme wildfire events, their structural causes, various impacts including on air quality, water quality, soil carbon and nitrogen stocks and greenhouse gas emissions, and the human, biological and physical processes at play is a prerequisite. The trade-offs and synergies between the various socio-economic, climate, and environmental elements influencing forest fires risk management and conditions of enhanced risk should be explored and analysed, particularly in wildland/rural interface areas. Methods to assess and mitigate vulnerability of societies to wildfires should also be developed. In addition, the relation of forest fires with other hazards that may trigger or result from fire (e.g., droughts, floods, debris flows, landslides, heatwaves and storms) should be investigated within a multi-hazard risk assessment framework.

Proposals should capitalise on the existing and develop new scientific knowledge (e.g. fire ecology, soil and water science, landscape restoration, social sciences), enhance understanding of the resistance, resilience and habitat suitability of mixtures of plant species, as well as the human factors (considering human behaviour, gender, economics and socio-demographic issues) affecting fire occurrence and develop strategic guidance for improved forest fire risk management and risk-informed decision-making.

Participatory approaches with national agencies and competent institutional bodies dealing with wildfire management and protection and land management are required. Actions should also promote increased interaction and strengthened cooperation between scientists, practitioners, forest and land owners and other key stakeholders. To ensure wide accessibility and use, they should also facilitate an inclusive approach in developing land management strategies through involving local communities in the design and planning of innovative fire prevention measures, strengthening the forest sector and promoting bio-economy and nature based solutions as well as in the co-design and co-production of research and corresponding outcomes.
In this context, actions are sought to develop and implement effective communication and societal outreach strategies to increase the awareness and preparedness of populations at risk towards a common culture of risk and more disaster-resilient communities. The outcomes should be made available through open access platforms (i.e. the Disaster Risk Management Centre, the European Forest Fires Information System). Actions should take advantage of data and information provided by the Copernicus programme, in particular the Copernicus Emergency Service.

Possibilities for clustering with actions supported under topic LC-CLA-12b-2020, LC-CLA-16b-2020, SC7 DRS-02 and other relevant ongoing and future nature-based solutions, LIFE and Civil Protection relevant projects should be envisaged, as appropriate, for cross-project co-operation, consultations and joint activities on cross-cutting issues and knowledge exchange as well as participating in joint meetings and communication events. To this end, proposals should foresee a dedicated work package and/or task and earmark the appropriate resources accordingly.

Collaboration with leading research institutions with experience in extreme wildfires management such as in Australia, Canada, South Africa, the United States and other non-EU countries is highly 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:

- National Forest Fires Risk reduction strategies and risk-informed decision-making emerging from collaboration with key stakeholders, in compliance with the policy objectives set out in the EU Forest Strategy and relevant EU policies;

- improved coherence between EU policies’ objectives and national legislative frameworks defining the structural measures and operational activities regarding forest and communities protection from fire;

- more disaster-resilient communities through increased awareness and preparedness of populations at risk and a common culture of risk;

- **increased knowledge exchange, sharing and access through the Disaster Risk Management Knowledge Centre, the European Forest Fires Information System and other open access platforms**;

- innovation, harmonisation and exchange on methods of consistently recording and measuring wildfires and coherent collection of data;

- common framework for forest fire (wildfire) firefighting modules, training, exercises, incident management and command.

**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-16-2020: Multi-hazard risk management for risk-informed decision-making in the E.U.**

**SwafS Key Word(s)** | Public Engagement, Responsible Research and Innovation (RRI)
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**Deadline** | 13 February 2020 17:00:00 Brussels time; 2nd stage: 03 September 2020 17:00:00 Brussels time

**Specific Challenge:** Risks due to natural hazards have increased dramatically in Europe, due to deep changes in climate, land use and socio-economic evolution since the 20th century. Improved disaster risk management and reduction requires an integrated approach to better forecast, prevent and adapt to multiple hazards, their interactions and impacts. Innovative and comprehensive methodologies, models and tools that assess multi-hazard risks and associated cascading effects and take due account of future drivers (such as climate change), have the potential to represent the leverage to help risk managers and decision-makers prioritise mitigation/adaptation actions, resilient preparedness and response, and develop sustainable and resilient development pathways.

**Scope:** Actions are encouraged to capitalise on and assess existing methodologies, models and tools for disaster risk management available at EU and national levels in order to define a common framework for risk and vulnerability assessments for areas exposed to multiple natural hazards. Based on the diagnosis of multi-hazards and multi-risk assessments, innovative decision-making tools that help planners to make effective and future proofed risk management choices need to be developed (e.g., dynamic adaptation pathways to address future and emerging threats). Sustainable adaptation options including ecosystem-based approaches such as Nature-Based Solutions – that are cost-effective and provide multiple co-benefits should be prioritised where appropriate.

Research actions should aim to develop a harmonized and standardised multi-hazard risk management approach in order to compare the threats and combined effects posed by several natural hazards (geological, hydrological, meteorological and biological), including hazards from compounded events, and evaluate the risks related to their interactions and cascade/simultaneous effects on the socio-ecological systems. A forward looking perspective, paying due attention to future trends and drivers (such as climate change) should be ensured. In this perspective, quantitative scenarios on present and future risks, on potential direct and indirect effects, in a multi-risk environment need further developments. **In order to be more operational, such a framework should be developed in close cooperation and dialogue between science and practice with the key actors and end-users to take into account their needs in the scientific development of multi-hazard/multi risk assessment methods and enable feasible solutions for more practical use.**

In light of the above, actions should also seek to develop mapping tools and user-friendly ICT open interfaces to better understand the model scenarios and outputs. Emphasis on systemic vulnerability of different sectors exposed to multi-hazard risk (e.g. agriculture, forests and other economic sectors, land use, infrastructure, ecosystems) will require particular attention in building the risk analysis. Similarly, uncertainty should be more consistently addressed to provide reliable estimates of vulnerability and risks. Action should take advantage of data and information provided by the Copernicus programme, in particular the Copernicus Emergency Service, and the European Research Infrastructure Consortiums (ERIC) such as the European Plate Observing System (EPOS) and the European Multidisciplinary Seafloor and Water Column Observatory (EMSO). Actions should also build upon and seek collaboration with the projects funded under the relevant SC7 DRS topics.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 3-5 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:

- a consensus in better definitions, indicators and functions to characterise multi-hazard risk through enhanced inter-disciplinary collaboration between the different science and practice communities addressing various types of hazards, disaster risk and sustainable development;
- prioritisation of investments and pertinent selection of effective risk reduction management options;
- enhanced capacity for identification of vulnerable, threatened areas and infrastructures most at risk from multi hazards in Europe;
- better informed forward-looking national risk assessments that also take into account long-term drivers such as climate change, and enhanced implementation of existing legislation and streamlining of policies;
- enhanced risk-informed decisions on land-use planning addressing trade-offs between differing prioritized adaptation options and competing policy goals;
- enhanced understanding of the relationships and interactions of multiple hazard, including compound events and cascading risks and risk related processes driven by environmental and societal changes on different time and spatial scales;
- better knowledge exchange through platforms such as Disaster Risk Management Knowledge Centre, and stakeholder networks on emergent risks and extreme events (e.g., Community of Users, Risk Knowledge-Action Network).

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-21-2020: Coordination of European Polar research

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Specific Challenge: The EU is a major investor and player in Polar research. The EU also supports the development and the international access to research infrastructures (terrestrial research stations, remote and in-situ observing systems, research aircrafts and vessels, etc.) throughout the Polar Regions, with relevant international scientific cooperation activities with non-EU countries. Previous actions proved to be instrumental in providing the needed support and the high degree of coordination within the European landscape and beyond.

Scope: Proposals should provide a platform to co-develop the strategies to advance and further coordinate the European Polar Research action and its contribution to the policy-making processes. This should include the prioritisation of research areas during transdisciplinary workshops, strategies
for capacity building related to meaningful stakeholder involvement, allocation of seed money for the preparation of pre-studies and interaction with national funding agencies on ways of building synergies and optimising the use of resources. Proposals should cooperate with the relevant services of the European Commission and provide evidence-based policy advice. A special focus should be placed on supporting the implementation of sustained observation systems in the Arctic and Antarctic by setting up a European coordination office and by identifying measures to sustain it beyond the termination of the project. The office should also coordinate and support the contributions of the EU and the Associated Countries to International Arctic Science Committee (IASC), Sustaining Arctic Observing Networks (SAON), Scientific Committee on Antarctic Research (SCAR) and Southern Ocean Observing System (SOOS). Proposals should coordinate the EU Arctic Research Cluster ensuring a good cooperation between the projects in areas such as communication, dissemination, and stakeholder engagement. Proposals should build upon the previous action funded under Horizon 2020 and avoid duplications or overlaps.

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.

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

- substantially advance Polar research cooperation in Europe by creating a Polar European Research Area;

- a more synergetic use of European resources;

- the policy advice at regional, national and EU level and to the support of the EU’s international commitments with respect to the Arctic Council, the Montreal protocol, the UNFCCC and others related to polar sciences, such as the Antarctic Treaty System (ATS);

- improved cooperation of international polar research programmes and create the basis for the development of future large-scale joint international polar initiatives;

- the support of international scientific cooperation initiatives of the European Commission such as the G7 Future of the Seas and Oceans initiative, Galway Statement, the Belém Statement and of the Administrative Arrangement on marine research between the European Commission and Argentina.

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.
SwafS Opportunities

LC-CLA-22-2020: Enhancing the Belmont Forum Collaborative Research Action on Climate, Environment and Health

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Specific Challenge: The EU is a major investor and player in both climate change and health research. The EU also supports global research and innovation collaboration, including that done by the Belmont Forum - a partnership of funding organisations, international science councils, and consortia committed to the advancement of interdisciplinary and transdisciplinary science. Bringing together climate change and health research has been a particular challenge in Europe that requires coordination and support. Previous similar actions proved to be instrumental in providing the necessary support and the high degree of coordination within the European landscape and beyond.

Scope: Actions should develop and provide support mechanisms to advance and further boost the global added value of the Belmont Forum’s Collaborative Research Action (CRA) on Climate, Environment and Health and its inputs to the relevant EU policy-making processes. This should include the promotion and prioritisation of research and innovation areas during transdisciplinary conferences, meetings and workshops, capacity building related to relevant stakeholder involvement, cross-fertilisation activities amongst Belmont Forum, EU-funded and relevant nationally funded projects, synthesis of their results, with a particular focus on policy making, such as knowledge based policy briefs, dissemination, communication and outreach.

Cooperation with relevant existing projects under Societal Challenge 1 and 5 of Horizon 2020, including relevant ongoing Coordination and Support Actions, is encouraged.

Actions should also provide support to a knowledge management platform of EU funded research and innovation on the linkages between health and climate, support the Belmont Forum Members, partners and secretariat, in relation to this CRA and support the organisation of an international conference on climate change and health.

Cooperation with the relevant services, expert groups and mechanisms of the European Commission will be required to provide evidence-based policy advice, and report on the CRA results and synthesis of their findings. Actions should also build upon EU research and innovation framework programmes and avoid duplication and overlaps.

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.

Expected Impact: The project results are expected to:

- contribute to policy advice on climate change and health at international and EU level and supporting the EU’s international commitments with respect to the Paris Agreement, UNFCCC and others related to climate change and health sciences;

- bolstering a network of projects funded under the CRA call with relevant EU-funded projects addressing climate, environment and health;
better flow of information and knowledge dissemination on climate change, environment and health to low and medium income countries;

- raising global awareness of climate impacts on human, plant and animal health.

**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.*

**LC-CLA-19-2020: Integrated GEOSS climate applications to support adaptation and mitigation measures of the Paris Agreement**

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**Specific Challenge:** Timely and reliable Earth observation data and information on the state of our changing climate and environment are indispensable to support the EU in its international commitment on climate change. In particular, the Paris Agreement accentuates the need for new, transparent, integrated solutions to better understand the Earth system, minimise and address climate change contributors and impacts, support accountability towards long-term goals and inform climate services and decision making. Developing integrated solutions tailored to needs in Europe will depend on the European capability to combine multiple Earth observation (EO) data sets - including GEOSS and Copernicus data sets - with ensemble modelling, socio-economic and in-situ data at the spatial and temporal scales at which interactions in the land, marine and atmosphere ecosystems operate.

**Scope:** Actions should focus on developing applications in support of users involved in the implementation of climate adaptation and mitigation actions in line with the Paris Agreement, by integrating a whole range of Earth Observation data including those recorded through in situ observing systems, and Essential Climate Variables (ECVs). The actions will seek to use higher spatial and/or temporal data sets while also taking advantage of a broader open data access and new data mining technologies. In addition, the actions should advance methodologies for integrating resulting data flows with multiple GEOSS data sets (from EO satellites to in-situ data including citizen data where appropriate), numerical model outputs and other relevant statistical and socio-economic data. Ultimately, integrated applications should concentrate on climate adaptation applications with estimated societal impact, on impact of GHG emissions or related indicators (such as land cover changes), or feed new indicators for the monitoring of progress towards the Sustainable Development Goals (SDGs) in an EU context. Special attention should be given to multi-scale approaches with abilities to scale up and down from European to local scales.

The actions should make use of, contribute to and feedback on the GEOSS platform which provides international user communities with tools for discovery, visualisation and access to GEOSS data. The actions should actively contribute to relevant GEO Tasks of the GEO Work Programme. It should contribute to the development of user-driven climate applications to be delivered through the EuroGEOSS initiative. They should promote open science and underpin the work of the IPCC through the enlarged provision of in-situ data and of further analyses of ECVs. Applications resulting from the
actions should complement relevant Copernicus core services (e.g. Climate Change Service - C3S, Land Monitoring, etc.) and address well identified end user needs in Europe. When relevant, actions should align with the European Space Agency (ESA) programmes. The Commission considers that proposals requesting a contribution from the EU in the range of EUR 4-5 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 direct support of the adaptation and mitigation measures of the Paris Agreement, as well as the other GEO engagement priorities such as the Agenda for Sustainable Development, and the Sendai Framework for Disaster Risk Reduction 2015-2030;

- the European input to the GEO Work Programme post-2019 to address the climate change challenge cross-cutting all GEO Societal Benefit Areas (SBA) (e.g. for improved land use management);

- increasing European capability to combine multiple EO data sets with models, socio-economic and in-situ data, based on a systematic exploitation of the GEOSS Platform;

- reinforcing in-situ component of European observing systems for the monitoring of internationally recognised Essential Climate Variables (ECVs);

- the new EuroGEOSS pilot applications to better understand climate change contributors and impacts, and minimise the degradation of the Earth system, support accountability towards long-term goals and inform climate services and decision making.

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-20-2020: Supporting the implementation of GEOSS in the Arctic in collaboration with Copernicus

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Specific Challenge: In order to gain more insight in the fast rate of climate, ecological and environmental change taking place in the Arctic and to facilitate well-informed decisions, there is a need to develop coordinated Earth observations and information services specifically targeting this region, also building on the essential contribution of indigenous knowledge and community-based monitoring systems. These observations and services need to be delivered in order to support a sustainable development in the Arctic, particularly for responding to the needs of the people who live there. Observations and services are also necessary to improve the monitoring and predicting capabilities on changes that may affect other parts of the planet, and in particular the Northern
hemisphere. The challenge and suitable actions to alleviate adverse consequences were identified in the 2nd Arctic Science Ministerial Joint Statement of Ministers.

Scope: The action should aim at: (i) advancing the operationalisation of an integrated pan-Arctic Observing System in preparation for a possible future ArcticGEOSS initiative; (ii) improving and extending the terrestrial, marine and cryospheric in-situ measurements and the community-based monitoring systems necessary for the monitoring of the Arctic; (iii) setting up pilot services and implementing the coordinated network of those services necessary for the adaptation to climate change in the region; (iv) contributing to the interoperability of Arctic Data systems; and (v) to make a positive contribution to national, regional and international decision-making processes and science strategies.

The action should help to build an Arctic “window” of Copernicus by bringing together all Arctic relevant observations deriving from different Copernicus services and promoting access to relevant Copernicus datasets.

The action should coordinate with projects stemming from the NSFs Arctic portfolio, such as the "Navigating the New Arctic" programme, and other actions of the Transatlantic Ocean Research Alliance, by establishing joint operational activities, in order to support the mission and objectives of the international initiative on Arctic observations brought forward by the Sustaining Arctic Observing Networks (SAON).

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged, in particular with the countries and Indigenous Peoples organisations participating in the 2nd Arctic Science Ministerial.

The action should build on the outcomes of previous EU-funded projects in the framework of GEO and Copernicus, create synergies and avoiding unecessary duplications also by joining the EU Arctic Research Cluster. Likewise, the action should cooperate with relevant projects funded by the ESA Earth Observation Programme. To this end, proposals should foresee a dedicated work package and/or task and earmark the appropriate resources accordingly.

The pilot services should fall into the scope of EuroGEOSS and follow the direction of the EuroGEOSS initiative. Data and services produced through the projects should be registered in the GEOSS Common Infrastructure (GCI).

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:

- the implementations the GEO-Cold Region Initiative with a specific emphasis on the Arctic, and the initiating of an ArcticGEOSS initiative;
- sound and effective decision-making by policy makers in the Arctic regions through the use of reliable and science-based Earth observation and information;
- supporting of the 2030 Agenda for Sustainable Development, the Paris Agreement and Sendai Framework for Disaster Risk Reduction 2015-2030;
- strengthening Earth observation capacity focused on the European region;
• delivering EuroGEOSS services for the Arctic;

• improved handling, archiving and interoperability of environmental data in polar regions;

• a coherent data management, through the use of GEOSS Data Management Principles and best practices (aligning with INSPIRE).

**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.*

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

**CE-SC5-24-2020: Improving the sorting, separation and recycling of composite and multi-layer materials**

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**Specific Challenge:** Composite or multi-layer materials are increasingly used in different applications. Products and materials are getting more and more complex, which affects the ability to retain the value of materials in successive uses. While the combination of different materials may provide unique and desirable properties to products, it also brings challenges for the sorting, separation, recycling or composting of the materials that constitute the products, whether in a compound form or separately. It also complicates their re-introduction into manufacturing processes. A better understanding of these challenges should inform the design of composites and multi-layer materials.

**Scope:** Proposals are expected to develop new or improve existing innovative processes for the sorting, disassembly/separation, recycling and/or the introduction into manufacturing process of materials from products made of composite and/or multi-layer materials and assess the potential barriers for their implementation. They can deal with used products, production rejects or existing stocks such us material recovered from industrial and municipal landfills. Proposals should aim to optimise value retention in the economy, rather than downgrading the composite or multi-layer materials for applications with low quality requirements, as compared to the value of the initial separate materials, especially for applications with high performance requirements. Proposals should also provide recommendations for the design of these applications, products or related materials, based on the lessons learned in the development of these processes, to enable an increase in volume and quality of reuse and recycling of these products. In addition, these recommendations should cover requirements for product information to enable effective identification and management after use (including consumer targeted labelling, where appropriate). The environmental impact (e.g. substitution of virgin plastics, water saving, impact on water quality), social impact (e.g. related to health and safety legislation) and cost of the innovative processes implemented (e.g. recycling processes) should be assessed in a holistic way, taking the entire lifecycle into account. The proposals are expected to provide evidence of the potential market impact that the proposed solutions could bring, including impacts on current economic actors in the chain and anticipated consumer...
acceptance and changes of consumer attitude (taking into account gender issues, when relevant). To this end, quantitative information on the size of the targeted market is expected. Participation of relevant industrial partners (technology providers, end-users etc.) is considered important. Activities are expected to achieve TRL 5-6 by the end of the project.

This topic is in support of the European Strategy for Plastics in a Circular Economy. Selected projects under this topic as well as projects selected under other topics in H2020 supporting the Plastics Strategy are strongly encouraged to participate in joint activities as appropriate.

These joint activities could take the form of clustering of projects, participation in workshops, common exploitation and dissemination etc. The proposals are expected to demonstrate support to common coordination and dissemination activities. Applicants should plan the necessary budget to cover those activities without the prerequisite to define concrete common actions at this stage.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 4-5 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 yield and quality of sorting of products made of composite or multi-layer materials;
- increased recycling of raw materials from products made of composite or multi-layer materials, in terms of volume and/or quality;
- reduced use of virgin raw materials;
- increased knowledge on how to design for reuse and recycling ("circular design") of products currently made of composite or multi-layer materials;
- increased knowledge on the process environmental footprint, including the net effects on greenhouse gas emissions, of improved sorting, separation and recycling of composite and multi-layer materials.

**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-SCS-25-2020: Understanding the transition to a circular economy and its implications on the environment, economy and society**

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**Specific Challenge:** The transition to a circular economy entails a systemic transformation of entire value chains, covering design, production and consumption phases, so that the value of products, materials and resources can be maintained in the economy for as long as possible, while reducing environmental impact. It also aims at increasing material productivity, including de-materialisation,
and exploring new representations and practices of property for individuals and collectives. Such a deep transformation is unlikely to happen suddenly and would rather follow some transition processes and pathways. Understanding, in critical and thoughtful way, the transition to a circular economy and its positive and negative implications on the environment, economy and society (including human health), will be important for the development and adoption of circular economy approaches, including the design of well-targeted transitional policy measures. Moreover, the identification and analysis of best practices of the transition to a circular economy in- or outside Europe, on a citizen, business sectorial and macroeconomic level, possibly covering different cooperation models (including B2B, B2C, P2P, etc.) will serve as an inspiration for specific projects. They also can inform new and adapted policies and policy tools including regulation, taxation and financing, incentives, strategic governance mechanisms and soft tools (e.g. communication and awareness raising tools) to further disseminating the concept of circularity.

**Scope:** The research will assess the current state of transition towards the circular economy in relevant economic sectors (public, private and non-profit) and analyse possible transition scenarios, as well as their outcomes and impacts. It will identify the key factors (regulatory, governance-based, market, technological, cultural, societal, gender, etc.) that can stimulate or hinder this transition. The selected sectors should be among the ones identified in the EU Circular Economy Action Plan. Additional sectors could also be selected, considering criteria such as environmental footprint, health issues, complexities of value-chain, dependency on imported materials and relevance for European economy. Implications of the transition, both positive and negative, for the economy, the environment and the society will be assessed qualitatively and as much as possible quantified. For that reason, appropriate models for analysing and quantifying the various implications and trade-offs and assessing the sustainability of circular economy should be developed. The implications considered should include social, economic and environmental aspects, such as trade flows, value-chains, labour demand, European industry competitiveness, regulatory frameworks, policy and governance mechanisms, public and occupational health, greenhouse gas emissions, use of energy, land, water, minerals and other resources, flows of resources at all relevant geographical scales, human health, social and territorial cohesion, and value distribution across society. The role of public awareness and acceptance and other social aspects, including gender issues, need to be considered. Where relevant, particular attention should be paid to the issue of hazardous materials in a circular economy. Policy recommendations for policy-makers at the local, national, European and global levels, including recommendations on governance issues, will be derived from the research. Involvement of relevant social sciences and humanities disciplines and expertise in behavioural economics and gender issues, is deemed important.

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

This topic is in support of the European Strategy for Plastics in a Circular Economy. Selected projects under this topic as well as projects selected under other topics in H2020 supporting the Plastics Strategy are strongly encouraged to participate in joint activities as appropriate. These joint activities could take the form of clustering of projects, participation in workshops, common exploitation and dissemination etc. The proposals are expected to demonstrate support to common coordination and dissemination activities. Applicants should plan the necessary budget to cover those activities without the prerequisite to define concrete common actions at this stage.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 3-4 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 systemic policy decisions to further facilitate the transition to a safe, environmentally friendly, efficient and effective circular economy in selected sectors;
- efficient and effective use of both primary and secondary resources in Europe, reducing waste generation, negative health impacts, environmental pollution and greenhouse gas emissions;
- new business opportunities for European industries and SMEs;
- creating new tools and methodologies oriented to companies, to consider social, environmental and economic aspects when they design circular business models;
- creating incentives and support the development of strategic governance mechanisms that enable the transition to a Circular Economy and contribute to the effective implementation of the Sustainable Development Goals in Europe;
- supporting the achievement of climate commitments and specific quantitative targets on resources efficiency, recycling rates or waste disposal quotas.

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-SC5-28-2020: Develop and pilot circular systems in plastics, textiles and furniture sectors

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Specific Challenge: Innovation is an indispensable part of the systemic transition towards a circular economy. In the past, innovation in sectors like plastics, textiles and furniture, often took place in silos, optimising for a specific aspect of the product or material. While these innovations have delivered improvements in one domain, they often weakened value creation or retention in other steps in the value chain, mostly downstream. An example can be found in the plastic packaging area, as combining multiple layers of different materials into one packaging item could deliver benefits for food preservation or transportation, but hinder cost-effective recycling. Systemic innovation should create value for the innovator actor and for the system as a whole. However, this potential has been explored only to a limited extent only. Hence, there is a need for designing and piloting circular systems, including business models, products and materials, and covering the entire value chain in scope, to test and demonstrate systemic innovation towards a circular economy in practice. Due to their mostly take-make-dispose products and business models, the plastics, textiles and furniture industries offer a clear potential for the design and piloting of circular systems.

Scope: The objective of this action is to develop and pilot systemic circular economy innovations in plastics, textiles and furniture sectors that take into account value retention throughout the lifecycle of the product or service. Proposals are expected to bring together all relevant actors from across the
value chain – from design and production, down to collection, sorting and reuse/repair/recycling – to rethink how to address the user’s need through a circular economy lens. Proposals should explore, develop and pilot systemic innovations that take into account value retention throughout the lifecycle of the product or service. Such innovations could cover design of business models, products and materials, industrial symbiosis, assuming the interdependencies and connections to the overall system in which the product/service is offered, are considered and acted upon. For example, designing office furniture to be easily upgraded/repaired requires the availability of spare parts, or designing plastic packaging to be composted requires the collection and transportation to a composting facility. The sectors in scope are one of the following three: plastics, textiles and furniture. Proposals are expected to provide quantitative information on the size of the targeted market, how that would evolve as a result of the proposed solution. Environmental and other societal benefits should be assessed from a lifecycle perspective and quantified. Participation of stakeholders across the value chain (e.g. material/product producers, end-users, collection(sorting/recycling organisations, etc.) is considered important. Data and information exchange across the different actors should be deployed, tested and evaluated to ensure value retention throughout the life cycle. The aim of this is to avoid silos of information and obtain a better understanding of the mutual dependencies between the several actors in the system and the changes on all technical and behavioural levels required to fulfil the full potential of systemic innovation. Activities are expected to achieve TLR 6-7 by the end of the project.

This topic is in support of the European Strategy for Plastics in a Circular Economy. Selected projects under this topic as well as projects selected under other topics in H2020 supporting the Plastics Strategy are strongly encouraged to participate in joint activities as appropriate. These joint activities could take the form of clustering of projects, participation in workshops, common exploitation and dissemination etc. The proposals are expected to demonstrate support to common coordination and dissemination activities. Applicants should plan the necessary budget to cover those activities without the prerequisite to define concrete common actions at this stage.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 7-8 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:

- effective use of both primary and secondary resources in Europe, reducing waste generation, environmental pollution and greenhouse gas emissions, through innovative systems;

- first-hand insights on how to develop and support systemic innovation towards a circular economy, starting from selected sectors;

- evidence to inform more systemic policy decisions to further facilitate the transition to an effective circular economy in selected sectors;

- systemic knowledge of product service systems and circular design management systems, to facilitate their systematic application;

- new business opportunities for European industries and SMEs;

- the achievement of climate commitments and specific quantitative targets on resources efficiency, recycling rates or waste disposal quota and gather more information on related greenhouse gas emissions;
- long-term value creation and positive impacts on the environment, health and quality of life of 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.*

**CE-SC5-30-2020: Plastics in the environment: understanding the sources, transport, distribution and impacts of plastics pollution**

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**Specific Challenge:** To date, efforts to understand the sources, transport and distribution of plastic pollution have mainly focused on the marine environmental compartment. However, it is widely acknowledged that the majority of marine plastic litter originates from land-based sources and that plastic litter of all sizes is prevalent in all environmental compartments (freshwater, marine, terrestrial, biological and atmospheric). To develop long-term mitigation solutions, a thorough understanding of the main sources and transport mechanisms of plastics into and through the environment is needed. This needs to be combined with determination of the quantity and composition, an understanding of plastic degradation processes in different environmental compartments and an assessment of plastics impacts on key species and ecosystems. In order to better support the identification of exposed ecosystems and to help decision-makers in reducing exposures, a wider effort bringing together experiences from different disciplines, such as hydrology, oceanography, limnology, monitoring, modelling, chemistry, toxicology, and risk assessments, and from relevant stakeholders, is needed.

**Scope:** The aim of this action is to gain a better understanding on the sources, transport, distribution and impact of plastic pollution. The main areas for research activities should include:

a) Sources of plastic pollution to different environmental compartments;
b) Transport and pathways of plastics into and through different environmental compartments;
c) Occurrence and distribution of plastic across all environmental compartments;
d) Accumulation, including in soil and the food chain;
e) Degradation mechanisms for different plastic materials under range of environmentally conditions;
f) Physical and chemical effects of plastic pollution on different biotic and abiotic environments.

This action should aim to determine of the main entry routes of plastics into the different environmental compartments (e.g. marine, surface and groundwaters, soils and air, as well as potential transfers between these compartments. Furthermore, it should investigate the fate and transport behaviour of plastics with the goal of improving our current understanding of exposure within biotic and abiotic compartments. This should include determination of the spatial distribution and variability of plastics from its sources into rivers, lakes, estuaries and coastal areas and the open oceans. The research should contribute to the identification of the entry pathways, transport and accumulation within the ecosystems, including the potential for actual accumulations in the food chain (beyond presence in digestive systems).
Proposals should address different ecosystems, geographical areas and spatial scales, including the main environmental media such as marine, surface and ground-water, soils, air and biota. This would require case studies in selected areas, across Europe considering the marine water column and the seafloor as well as surface water and terrestrial ecosystems, and comparative data on the contribution of point and diffuse sources and transport pathways to the scale of plastic pollution. To enhance understanding of the processes that drive the transport and fate of plastics in different ecosystems and on different temporal-spatial scales, computational models validated with empirical data, that predict hotspots and sinks of plastics would be also needed. Proposals should also enhance the current understanding of plastic degradation in the environment, including the characterisation of leaching chemicals and plastic degradation products. When the degradation of plastics under environmental conditions cannot readily be predicted based on information available from material sciences, degradation experiments simulating realistic weathering of plastics will inform about the fragmenting process of plastic debris as well as the release of chemicals. Research could cover nano-, micro-, or macro-plastics.

Cooperation with existing national and EU funded activities, such as the JPI Oceans initiative, is encouraged.

This topic is in support of the European Strategy for Plastics in a Circular Economy. Selected projects under this topic as well as projects selected under other topics in H2020 supporting the Plastics Strategy are strongly encouraged to participate in joint activities as appropriate. These joint activities could take the form of clustering of projects, participation in workshops, common exploitation and dissemination etc. The proposals are expected to demonstrate support to common coordination and dissemination activities. Applicants should plan the necessary budget to cover those activities without the prerequisite to define concrete common actions at this stage.

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:

- achieving the objectives of the Plastics Strategy, in particular with regard to the possibilities for future prioritisation of measures in Europe (prioritisation);
- providing a foundation for the development of mitigation solutions, based on improved and new knowledge on plastics pollution;
- identifying promising intervention points and targeted actions for fighting plastics pollution, in line with of the CE Action Plan and Plastics Strategy;
- establishing the EU as a scientific leader in the area of understanding and solving plastic pollution.

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.*

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**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.

This specific challenge addresses the development of "innovative pilot actions", 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 – RMIS. Actions should also contribute to improving the awareness of relevant external stakeholders and the general public across the EU about the importance of raw materials for society, the challenges related to their supply within the EU and about proposed solutions which could help to improve society’s acceptance of and trust in sustainable raw materials production in the EU.

All actions should facilitate the market uptake of solutions developed through 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 NPV) with clarified management of intellectual property rights, and commitment to the first exploitation.

In support of the EIP on Raw Materials actions should envisage clustering activities with other relevant selected projects for cross-projects co-operation, consultations and joint activities on cross-cutting issues and share of results as well as participating in joint meetings and communication events. To this end proposals should foresee a dedicated work package and/or task, and earmark the appropriate resources accordingly.
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:

**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 Protocol, 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:
• 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.


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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 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 – RMIS).

In support of the EIP on Raw Materials actions should envisage clustering activities with other relevant selected projects for cross-projects co-operation, consultations and joint activities on cross-cutting issues and share of results as well as participating in joint meetings and communication events. To this end proposals should foresee a dedicated work package and/or task, and earmark the appropriate resources accordingly.

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

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 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 trade. 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.

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 materials.

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 Initiative 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 Strategy, 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;

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

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**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. Substitution provides an alternative approach to reduce the EU’s consumption of CRMs and decrease the relative dependence upon imports as well as related adverse environmental impact, and therefore ensures the sustainable supply of critical raw materials to the EU.

The challenge for industry is to scale up promising technologies raw materials production or substitution of critical raw materials, 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.

This specific challenge addresses two major targets of the European Innovation Partnership (EIP) on Raw Materials: the development of "innovative pilot actions" (subtopic c)) and finding substitutes for at least 3 applications of critical and scarce raw materials (subtopic d)).

**Scope:** Actions should develop innovative pilots demonstrating clean and sustainable production or substitution of non-energy non-agricultural raw materials in the EU, 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 – RMIS.

Actions should also contribute to improving the awareness of relevant external stakeholders and the general public across the EU about the importance of raw materials for society, the challenges related to their supply within the EU and about proposed solutions which could help to improve society’s acceptance of and trust in sustainable raw materials production in the EU, 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 NPV) with clarified management of intellectual property rights, and commitment to the first exploitation.

In support of the EIP on Raw Materials actions should envisage clustering activities with other relevant selected projects for cross-projects co-operation, consultations and joint activities on cross-cutting issues and share of results as well as participating in joint meetings and communication events. To this end proposals should foresee a dedicated work package and/or task, and earmark the appropriate resources accordingly.

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.

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 disposal.

c) Mining pilots (2020): Actions should develop and demonstrate innovative mining systems to avoid exposure of workers in dangerous operations, to increase efficiency, selectivity and profitability of the mining operations, to minimise environmental impacts during the mining life cycle, to improve social acceptance and trust in the innovative solutions, The actions should develop a plan to communicate to policy makers on alignment of public policies with emerging innovative mining systems. Any of the metallic, industrials and/or construction minerals could be targeted. However, the importance of the targeted raw materials for the EU economy has to be duly demonstrated in the proposal.

d) Pilots on substitution of critical and scarce raw materials (2020): Actions should develop and demonstrate innovative and sustainable solutions for the appropriate substitution of critical and/or scarce raw materials use in applications related to any of the high tech sectors, such as the low-carbon renewable energy, electric and electronic, mobility sectors, etc. Actions should build on existing research and aim at scaling-up and market uptake of the most promising solutions.

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:

**sub-topics a), b)**
- 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.

**sub-topic c)**
- achieving the targets of the EIP on Raw Materials, particularly in terms of innovative pilot actions on mining for innovative production of raw materials;
- demonstrate a market potential and the competitive technology advantage that will be gained through the pilot leading to expanding the EU business and to be implemented across the EU after the project is finished;
- push the EU to the forefront in the area of mining technologies and solutions through generated know how (planned patents, publications in high impact journals and joint public-private publications etc.);
- lead to unlocking substantial reserves of new or today unexploited resources within the EU;
- create added value and new jobs in raw materials producing, equipment manufacturing, information and communication technologies and/or downstream industries;
- lead to improving the environmental (including reduction of emissions), health and safety performance of the mining operations.

**sub-topic d)**
• achieving the targets of the EIP on Raw Materials to find substitutes for at least three applications of critical or scarce raw materials;

• have a market potential and the competitive technology advantage that will be gained through the pilot leading to expanding the EU business and to be implemented across the EU after the project is finished;

• speeding-up industrial exploitation and take up of results of substitution's projects.

Type of Action: Innovation action

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

SC5-26-2020: Sustainable management in extractive industries

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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. In order to secure the sustainable access to primary raw materials, including metals, industrial minerals, construction raw materials, and particularly Critical Raw Materials for the EU economy, there is a need to tackle a number of specific non-technology challenges related to the raw materials policy framework including access to mineral deposits, land use planning and permitting procedures.

Scope: The actions should strengthen raw materials policy framework and foster mineral production in the EU. They should ensure cross-sectoral policy coordination and integration aspects covering economic, environmental and social aspects in the value chain of the extractive life cycle from finding and access to deposits to closure and rehabilitation, while focusing on access to deposits and permitting process. Actions should take into account various external stakeholder interests and the general public, address circular economy and sustainable development aspects.

The actions should develop a toolkit applicable across the EU Member States for assessing socio-economic and environmental impacts, land-use planning, health and safety issues, and reporting official statistics to support transparent permitting process of mining projects. Based on the toolkit, actions should develop training materials and organise capacity-building workshops for competent authorities, industry and civil society in different Member States in different regions the EU and at the EU level.

The actions should avoid duplication and build up on the results of the previous actions on the raw materials policy and legislative framework, mineral deposits of public importance, land use planning, engaging relevant authorities of different EU regions.

All actions should contribute to improving EU official statistics and building the EU knowledge base of primary and secondary raw materials (EC Raw Materials Information System – RMIS).

In support of the EIP on Raw Materials actions should envisage clustering activities with other relevant selected projects for cross-projects co-operation, consultations and joint activities on cross-
cutting issues and share of results as well as participating in joint meetings and communication events. To this end proposals should foresee a dedicated work package and/or task, and earmark the appropriate resources accordingly.

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:

- achieving the objectives and the implementation of both the Raw Materials Initiative and the EIP on Raw Materials, in particular in terms of the improving framework conditions for primary raw materials production in the EU;

- better informed and more efficient decision-making by the EU and Member States policy makers and the producers and users of raw materials regarding the supply of raw materials;

- 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, duly taking into account the applicable EU environmental legislation;

- facilitating more integrative and coordinated raw materials policy frameworks in the EU and at the Member States level.

**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.*

**SC5-27-2020: Strengthening international collaboration: enhanced natural treatment solutions for water security and ecological quality in cities**

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**Specific Challenge:** It is expected that, by 2050, half of the human population will live in cities and possibly half of them will live in informal settlements without appropriate waste water collection infrastructure and treatment facilities. In view of the increasing pressure on water resources worldwide, collection, recycling and safe reuse of polluted water is considered to be an essential component for sustainable water resources management. Surface and groundwater in cities and downstream urban areas may suffer serious pollution from point and diffuse sources from upstream and in-catchment which might have a negative impact on the ecology, quality of life and land values in the city. Furthermore, urban run off, storm water and waste water represents a threat for water quality because of the pollutant load it conveys. Enhanced nature-based treatment solutions (such as artificial wetlands and lakes, bio-filtration, etc.) have the potential to remove pollutants from water (e.g. storm water, urban run off, river water, wastewater) that will lead to improved water quality and water use efficiency. Such natural treatment measures, when well planned and integrated into
the overall urban planning and design, can also contribute to climate adaptation by reducing flood risk and heat island effects and constitute attractive components of the urban landscape. The innovation challenge is therefore how to design enhanced natural treatment systems that will provide effective ecological services of water purification and storage, as well as valuable habitats, constitute integral part of the overall urban water cycle and attractive components of the urban landscape and ensure that in closing the water cycle challenges associated with chemical and biological hazards are properly addressed through well-defined and validated risk assessment methodologies and implemented in relation to the final water use.

**Scope:** Actions should identify and review examples of innovative natural water treatment systems in Europe and beyond to develop understanding of their functioning, the ecological processes involved and their capacity and performance in treating pollution under diverse and uncertain conditions, such as maximum/minimum loads, uncertainties on composition of the pollution entering the system, necessary time for the treatment, capacity to cope with temporal variation in rainfall, etc. They should develop methodologies and guidance for the design and implementation of urban enhanced natural treatment systems and their integration into the urban water cycle, the urban landscape and the receiving waters to enhance the circularity and hence sustainability of the overall system. They should develop new business models for their construction, operation and long-term management and maintenance and standards for the treatment processes and the different uses for which the effluent may be used within different regulatory frameworks.

Actions should include pilots/demonstrations for testing innovative approaches or the use of established solutions under new conditions and monitoring from baseline through construction and for a period of time, to establish the functionality of the system and assess the physical, social and economic benefits of the deployed solutions. Appropriate methodologies for public/social engagement in the implementation of such solutions should be developed.

Actions should envisage clustering activities with other relevant ongoing and future nature-based solutions relevant projects funded under previous and current H2020 Work Programmes for cross-projects co-operation, consultations and joint activities on cross-cutting issues and share of results as well as participating in joint meetings and communication events. To this end, proposals should foresee a dedicated work package and /or task and earmark the appropriate resources accordingly.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is strongly encouraged. International participants should explore the possibility to apply for co-funding under their national governments.

To ensure coverage of geographic, socio-economic and cultural diversity (including possible gender differences in the use/management of water) as well as sharing innovative solutions across the EU, pilot actions/demonstrations must be implemented in at least 3 cities situated in different Member States or Associated Countries that are committed to implement the proposed innovative actions/schemes during the project and assess their impacts and cost-efficiency.

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:

- increased use of innovative natural water treatment measures as Nature-based solutions, integrated into the overall urban water cycle and constituting attractive components of the
urban landscape for more sustainable urban water management that enhance the overall urban metabolic processes and mitigate impact on receiving waters;

- enhanced water availability with reduced pressure on existing freshwater resources through treatment, remediation, reclamation and re-use of polluted water and wastewater streams;

- increased investments into natural water treatment solutions from urban authorities, water companies or property developers through evidence of the benefits for deploying such "systemic" approaches as opposed to alternative water treatment systems;

- sharing and cross-fertilization of capacity, expertise and know-how among European and international partners on new innovative natural water treatment concepts and solutions for enhanced opportunities for up-taking, upscaling and business in the European and global markets;

- increased business opportunities for the design, development and installation of natural water treatment measures in cities.

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.

SC5-32-2020: Addressing wild pollinators decline and its effects on biodiversity and ecosystem services

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Specific Challenge: Wild pollinators are declining in occurrence and diversity in the EU and numerous species are threatened with extinction. This is a serious cause for concern because pollinators are an integral part of healthy ecosystems, where they play a central role in the maintenance of ecosystem functioning. Without them, many plant species would decline and eventually disappear, along with the organisms that depend on them. Since the majority of European flowering plants (78 %) are pollinated by animals and around 84 % of European crop species benefit to various extents from insect pollination, the decline of pollinators will have far-reaching consequences on terrestrial ecosystems, their services and many plant species and can lead to their collapse in the long term. This would inevitably hinder the EU’s path to sustainable development and threaten economy and human wellbeing. Besides pollination services, pollinators can enhance, especially at landscape scale, other ecosystem services, such as pest control, soil and water quality, landscape aesthetics. This also contributes towards biodiversity conservation and diversity of crops underpinning a diverse, healthy human diet and nutritional security. In addition to the IPBES report on Pollinators, Pollination and Food Production (2016), valuable knowledge has been generated through past EU-funded projects and the European Red List of pollinators. While these clearly demonstrate an alarming decline of wild pollinators and warrant immediate action, the knowledge gaps are still considerable to assess the full extent of the decline and its repercussions on human society and the economy.
Scope: Building on the results of previous and/or currently ongoing EU-funded research projects, taking account the follow-up of the IPBES assessment on pollinators, pollination and food production, and in line with the EU Pollinators Initiative, actions should develop tools, guidelines and methodologies to better understand, analyse, assess and possibly predict the trends and causes of the wild pollinators decline, in particular their interaction and cumulative effects, the links between pollinator, plant, biodiversity, under farming and other land management practices, and ecosystem functioning. They should assess and valuate the wild pollinators ecosystem services and their impacts on nature, society, human wellbeing and the economy at different spatial scales. Actions should address the relations between plant diversity and pollinator diversity, competition for floral resources and interchangeability, as well as factors determining spatio-temporal variation of pollinator communities, including ecological and human factors such as land use change, agricultural land management and climate change. Actions should bring further insight on how the composition and configuration of the landscape affects plant-pollinator interactions, what influences the pattern of movement of pollinators across landscapes and how changes in species mobility and foraging behaviour impact the reproduction of plants.

Actions should take advantage of data and information provided by the Copernicus programme, in particular from the Copernicus Land Monitoring and Climate Change Service. A systemic approach should be favoured considering all factors influencing plant - pollinator diversity and distribution. They should mobilise wider public engagement through, for example, citizen science initiatives and should undertake extensive knowledge dissemination and communication activities towards policy makers and other stakeholders, such as bee-keeping and farmers associations, civil society organisations such as NGOs, and the food industry and inform relevant science-policy processes and relevant policy actions at EU, Member State and regional levels.

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:

- mitigation of causes and consequences and reverse trends in wild pollinators decline;
- better informed EU-wide and global pollinators relevant policy and decision-making through timely dissemination of research outcomes to UN conventions, IPCC, IPBES and SBSTTA;
- more accurate assessment, predictions, valuation and mapping of the multiple ecosystem services linked to wild pollinators, enabling their mainstreaming into natural capital accounts;
- enabling adequate policy responses in the areas of the environment, agriculture and health, and allow tracking EU progress towards the UN Sustainable Development Goals 2 (‘Zero hunger’) and 15 (‘Life on land’);
- delivering key knowledge for the preparation of key indicators and methodologies for monitoring pollinators;
- an integrated assessment framework to address pollinators decline and its impacts on nature, society, human wellbeing and the economy.

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.

SC5-33-2020: Monitoring ecosystems through research, innovation and technology

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Specific Challenge: Biodiversity continues to decline in every region of the world, significantly affecting ecosystem services as well. More than ever, there is a need to enhance the capacity to monitor changes in natural capital, to better understand links between biodiversity loss and the drivers of change and the impact of the former on our society. Ongoing monitoring efforts are spatially and temporally fragmented and taxonomically biased. Key data sets are either not updated or are updated irregularly, so that long-term information is limited. On the other hand, many EU policies, action plans, programmes and initiatives (such as the Common Agricultural Policy, the EU Biodiversity Strategy, or the 7th EAP) increasingly rely on the supply of harmonised and regularly updated biodiversity data, but EU initiatives to support the monitoring of components of EU biodiversity lack a comprehensive approach. As a result, the actual uptake and use of monitored biodiversity data in policy design, implementation and evaluation is still far too low.

The challenge is therefore to harness scientific advances and bring together various actors to strengthen current efforts and devise a structured and cost-effective EU-level approach to ecosystem monitoring combining in-situ, space and air-born monitoring.

Scope: The action should design an EU-wide framework for monitoring biodiversity and ecosystem services, which

- integrates different reporting streams, data sources and monitoring activities at international, EU, national and regional level (including remote sensing, citizen science and citizens observatories);
- is cost effective;
- links to policy targets, indicators and assessments;
- builds on best practices in EU Member States;
- delivers timely data, which is comparable over time and across the EU Member States.

The action should provide scientific advice and practical analysis on the best EU-level monitoring approaches related to measuring the implementation of key EU ecosystem and biodiversity targets. This includes:

- an analysis of which parts of ecosystems and biodiversity are covered by established monitoring programmes or current initiatives (such as the Pollinators Initiative, the Bioeconomy strategy, etc) and what are the most important gaps;
- designing accurate and cost-effective techniques for establishing regular and comprehensive monitoring systems to fill these gaps (e.g. in-situ surveys, integration of satellite & ground observation data, use of new technologies, etc), and estimating their cost.

The action should play a coordination role, facilitating exchange and discussion between relevant actors, including national and EU level bodies, as well as organisations such as the EEA. It should contribute to a more comprehensive and long-term monitoring of EU ecosystems and biodiversity, building also on existing data collection programmes.

This work could also support/benefit from the EU’s contribution to international biodiversity agreements and initiatives, such as IPBES, GEO/GEOSS and the Global Biodiversity Information Facility.

The action should also facilitate the work at Member State level to build the national data foundations needed for ecosystem assessment and accounting, by supporting the exchange of experience and by providing capacity building, technical support and workshops. The action is expected to work with KIP INCA partners, as well the EEA, to ensure long-term implementation of biodiversity and ecosystem services monitoring and support the data-related work of relevant EU-funded projects to facilitate the coherence and compatibility of their data and their integration into existing EU-level data bases. Proposals should explore potential synergies with previous and future actions funded under the EU research and innovation framework programmes and avoid duplication and overlaps.

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.

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

- the implementation of the Bioeconomy Strategy, including the better use of Copernicus through calibrating with ground data;
- the implementation of ecosystem-related EU policies, action plans, programmes and initiatives; in particular via the MAES and INCA processes;
- scenarios, assessments and data in the context of initiatives, such as IPBES, GEO/GEOSS, the Global Biodiversity Information Facility or IPCC; and in EU initiatives on Nature-based Solutions or sustainable agriculture.
- proposing EU-level monitoring approaches of key EU ecosystem and biodiversity targets (including recommendations on the most accurate and cost-effective techniques);
- the integration of citizen-science data (e.g. bird and butterfly records) and research data depositories (e.g. the European vegetation archive) into publically accessible EU-level data bases.

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.
SC5-22-2019: Assessing and fostering the impacts of Research and Innovation Actions (RIA) and Innovation Actions (IA) granted by Societal Challenge 5 in 2014-2015

SwafS Key Word(s) | Science Communication
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Deadline | 19 February 2019 17:00:00 Brussels time

Specific Challenge: Impact is one of the keywords of Horizon 2020. The Horizon 2020 Regulation establishes performance indicators aimed to facilitate and measure the overall impacts of the funded actions. The Work Programme 2014-2015 listed the expected impacts of each specific topic, which were used as criteria to evaluate proposals and select the projects to be funded. Nevertheless, despite this emphasis on impact, the overall performance indicators defined in Horizon 2020 are not sufficient to fully capture and assess the outcomes and impacts of projects; in particular in relation to innovation performance and its effects on resource efficiency, environment and climate change. In a context of tighter budgets and more public attention on the effectiveness of public funding and EU-funded research, there is a need to assess the performance, impact and effectiveness of actions funded by Horizon 2020.

Scope: The action should assess the impacts of all the Research and Innovation Action (RIA) and Innovation Action (IA) projects funded by Societal Challenge 5 under the 2014-2015 Work Programme through in-depth quantitative and qualitative analysis (87 projects in total).

The action should apply an existing methodology, or develop a more suitable one, to measure and better understand the progress made by and achievements of these projects. The projects’ impacts should then be compared with the expected impact statements in the Work Programme for each of the relevant topics. Among others, the impacts assessed should include: state-of-the-art, knowledge creation, scientific progress and filling knowledge gaps; impacts on environmental and climate objectives; support and contribution to the European policy targets; improving resource and energy efficiency; better air, soil and water quality; creation, implementation and deployment of technological and social innovative solutions; creation of new market opportunities; market and social uptake, replicability of innovative and sustainable technological and non-technological solutions; enhanced competitiveness; leverage of additional investment in research and innovation in green solutions; and contribution to the SDGs.

The assessed projects could achieve relevant impacts not explicitly mentioned in call text. For these cases the action shall identify and assess the additional impacts.

The proposals should identify the actions needed to achieve the impacts planned in the grants agreements of funded projects, as well as any barriers to their achievement. Best practices and recommendations for effectively and realistically enhancing the potential impact of actions funded by future work programmes should also be proposed.

The action should engage in active communication and promotion of its results, including a final dissemination workshop.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 0.6 million and with a duration of 12 months would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts or duration.

Expected Impact: the action is expected to contribute to:
• maximising the impact of Societal Challenge 5 projects on environmental (including climate), social and economic objectives;

• enhancing the outcomes of future Work Programmes, through a better understanding of the relationship between the Work Programmes and project impacts;

• demonstrating and improving the performance of projects funded by Societal Challenge 5;

• preparing the Societal Challenge 5 part of the future ex-post evaluation of Horizon 2020.

**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.*
Societal Challenge 6: Europe in a changing world – inclusive, innovative and reflective societies

Call – Migration

MIGRATION-04-2020: Inclusive and innovative practices for the integration of recently arrived migrants in local communities

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Specific Challenge: The arrival of migrants contributes to diversifying the demographic, cultural, linguistic, ethnic and religious makeup of already diverse European cities and suburbs and rural communities. This may represent an opportunity, but also a significant challenge if taking place in an unorderly manner, as occurred in Europe since 2014. The challenge is to provide policy makers at local, regional, national and supra-national level, civil society organizations and other relevant actors with effective, responsive, flexible, context-specific and culture-specific proposals for measures to promote socio-economic integration and inclusion as well as access to rights and services. This includes sustainable and participatory strategies, also with the involvement of citizens, civil society actors, education institutions and the private sector.

Scope:

a. Innovation action-Lump Sum

The further improvement of the effective integration of newly arrived migrants into societies requires an understanding of existing integration policies and practices. Proposals should examine the provisions for migrants' rights and their access to social services in the host countries, in particular, in the aftermath of the recent unorderly migration flows since 2014. Special attention should be paid to past, existing and potential mechanisms to support the integration of migrant men and women, through participatory practices, social innovation and entrepreneurship, diaspora communities and local civil society initiatives. This Innovation action will develop and test potentially viable approaches through pilots. It will closely involve migrants, members of the host communities, public authorities and researchers, from preparing the concept over their implementation to their evaluation.

The Commission considers that proposals requesting a contribution from the EU in order 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. The Commission foresees that in principle one Innovation Action will be funded.

Please note that this topic will take the form of lump sums as defined in Commission Decision C(2017)7151 of 27 October 2017. Details of the lump sum funding pilot scheme are published on the Funding & Tenders Portal together with the specific Model Grant Agreement for Lump Sums applicable.
b. Research and Innovation Action

Proposals should comparatively assess the effectiveness of integration policies and practices in major migrant-receiving spaces, in local communities, ranging from urban spaces to rural areas. This should include migrants’ access to civic and social rights, social services and facilities (e.g. language tuition and healthcare) in accordance with their legal status, as well as intercultural interaction (including gender aspects) and adaptation to increased diversity of the population. Proposals should also explore social cohesion and societal fragmentation, and how these aspects are accounted for in migrant integration policies. The urban and rural governance of integration processes should be analysed and assessed against the backdrop of a broader multi-level governance framework, whereby potential and real tensions between the local and other levels of governments should be explored. Attitudes to migration and integration by both migrants and the host communities should be studied as well. The role of religious communities could also be examined in relation to outcomes of integration processes. The incorporation of historical and comparative insights from migrant integration processes in relevant non-European societies is strongly encouraged. Cooperation with non-European scholars is also encouraged. This could be done by cooperating with scholars from Africa and the Middle East given the migration relations these regions have in migration policies and dynamics with the EU, as well as with Canada with which strong international cooperation on migration research in ongoing. Processes of exclusion, actions and initiatives to redress them, as well as mutual influences between host and migrant communities could be studied, including the analysis of the impact of these dynamics with relations of migrants with their origin countries. Projects should compare the different practices and experience on their viability, efficiency and transferability. They should deliver policy recommendations. Projects should establish a regular exchange with the stakeholders from the different communities and municipalities.

The Commission considers that proposals requesting a contribution from the EU 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. The Commission foresees that in principle two Research and Innovation Actions will be funded. The outputs of MIGRATION-04-2020 should also be made readily available for cooperation and synergy with MIGRATION-10-2020, a CSA which will compile the outputs of existing research on integration, including such RIAs and IAs.

**Expected Impact:** Projects will enhance the knowledge base on integration of migrants in local communities. The actions will contribute to improved practices, policies and strategies at local, national and EU level for the integration of migrants in European urban and local settings. This will help increase the possibilities for migrants to thrive and flourish in the labour market and in society. They will advance the implementation of the EU Urban Agenda (building on the specific Partnership on Inclusion of Migrants and refugees and of the UN Sustainable Development Goals related to making cities inclusive, safe, resilient and sustainable.

The pilots developed with the Innovation Action will offer new tools for enhancing the integration of migrants across Europe. This will provide actors working in this multilevel system of governance with already tested options that should be scalable and replicable in different environments with the context specific adaptations. Their evaluation will provide conclusions and recommendations for policy making at local level as well as for the regional, national and European level to create best possible conditions in which local authorities and their stakeholders can operate.
The Research and Innovation Action should deliver analysis for better understanding the phenomenon. Projects should identify approaches and practices, which can be applied in both cities and rural communities, as well as those that would be specific to one or the other. This will expand the knowledge both of dynamics of integration and of the policies managing such process, shedding light on potential gaps and needs which should be addressed by policymakers. The actions will contribute to finding new ways to integrate migrants into European societies, to ensure their cohesion and thus exploit the potential opportunities of migration.

**Type of Action:** Innovation action Lump Sum, Research and Innovation action

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


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**Specific Challenge:** At a time where the integration of refugee and migrant children into host societies is most pressing, education systems face multiple challenges due to growing cultural, linguistic and ethnic diversity and to socio-economic inequalities.

**Scope:**

**Innovation Action (2020):**

Building on existing evidence, including from projects funded under topic Migration-6 2018 where relevant, proposals should implement pilot actions able to experiment formal, informal and non-formal education solutions to address the integration challenges of children (0 to 18 years old - ISCED 0-3) from recent migration cohorts, in particular children of refugees and asylum seekers, and unaccompanied minors, including those residing in hotspots and reception centres. The proposals shall include actions with local schools, teaching programmes and organizations working with children (with or without migration background) and focus not only on formal educational settings but also on informal social and learning environments, beyond schools. Proposals should address at least three of the following dimensions: governance and funding of education institutions, funding of integration actions targeting children, roles and attitudes of families, gender aspects, communities, civil society organisations and local service providers, preparedness of schools and teaching staff, practices for language learning and use of native languages alongside the language used at school. Proposals should build upon good practices identified with the involvement of stakeholders such as e.g. practices of mutual cultural participation and exchange, or equal opportunities in regards to gender. Attention should be paid to existing educational centres around Europe which having high rates of migrant and ethnic-minority children are achieving academic results above national averages, as well as how the issues already mentioned are being articulated.
Proposals should address at least 3 of the points above, piloted on the basis of clearly defined goals. Processing of personal data of migrants must be conducted in accordance with EU data protection legislation¹ and existing regulation such as eIDAS.

Proposals should engage all actors and consider the potential for co-creation work with all relevant stakeholders, including migrant children and their families themselves, in the design and delivery of services. In addition, proposals should demonstrate their reusability or scalability and should develop a strong and realistic plan to ensure the long-term sustainability as well as take up of the results by the identified users. The involvement of multi-disciplinary and multi-sectoral teams is encouraged to explore the complexity of this challenge, to identify the necessary changes, and the risks and barriers to their implementation, addressing diversity as appropriate (gender, age, social-, cultural-, linguistic-, religious background). Proposals shall combine strong academic knowledge and research-action based support, with stakeholders and practitioners knowledge in the several fields identified above. Children voice must be taken into account in line with Article 12 of the UN Convention on the rights of the child.

The Commission considers that proposals requesting a contribution from the EU 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.

Expected Impact:

(2020):
The actions will inform policymakers, families, teachers and other stakeholders on effective practices for integrating migrant children in schools and more broadly in society, and for developing more inclusive schools, able to increase sense of belonging of all children, including both boys and girls. They will enhance synergies and cooperation amongst these actors for the uptake of innovative practices, for monitoring and data collection and for the definition of research gaps. Proposals should develop and implement actions which can be adapted, rescaled and reproduced in different environments according to the local/regional needs and involve stakeholders from public administrations, civil society, migrants and the host community from a very early stage as appropriate.

Type of Action: Research and Innovation action, Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.
MIGRATION-09-2020: Narratives on migration and its impact: past and present

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**Specific Challenge:** The way we collectively discuss about migration has an impact on the production of policies and responses to address this phenomenon. Narratives on migration - be it in the media, public or political discourses - affect political processes across Europe, influence our perceptions on migration dynamics and ultimately have an effect on the integration of migrants in our societies. The challenge is to understand and explain the causes and consequences of such narratives, examining their construction and assessing their effects on attitudes to migration and on society at large. By identifying the responsibility of each stakeholder - policy-makers, civil society organisations, citizens and migrants - in shaping these narratives, and by shedding light on the consequences of discourses on migration, the role and responsibility of each stakeholder will be better defined and their competences enhanced.

**Scope:** Proposals should address the dynamics and developments of migration narratives at local, national and EU level. Moreover, projects that include countries of origin and transit would be welcome. They should examine the general and potential long-term societal impact as well as the ethical implications of narratives on policy making. Successful projects should study the historical perspectives and changes in attitudes of non-migrant populations towards migrants and vice versa. Furthermore, projects should analyse the extent to which migrants’ voices are included in the shaping of these narratives. Research could also address innovative ways for migrants to shape their testimonials and narratives. This could include the role of ICT and social media, literary and artistic representations and may involve cultural heritage representation e.g. in museums, or other artistic products and events. Proposals could also explore, through collaboration with relevant international partners from countries of origin, how migration narratives and their transmission affect migration decisions and behaviours of potential migrants, taking into account gender aspects where relevant, including the use of social media to facilitate migration. For the study of the impact of media and public narratives on perceptions, opinions, attitudes and behaviours of different categories of people, the use of innovative research methods, including experimental ones and the methodologies offered by the research infrastructures for social and cultural innovation, is strongly encouraged.

The Commission considers that proposals requesting a contribution from the EU 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.

**Expected Impact:** Practitioners will be informed by the new knowledge produced on the consequences of discourses on migration. This may have an impact on their conduct and policy choices when relevant. Projects will improve access and dissemination of information on narratives of migration and their effects including their scale, patterns and the social and economic impact on host societies. This will contribute to a more informed debate on migration and about public perceptions of migration. In the longer term, they may
contribute to changing the debate on migration in European societies, opening new opportunities for a successful integration of migrants.

**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.*

**MIGRATION-10-2020: Sustainable practices for the integration of newly arrived migrants into societies**

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**Specific Challenge:** The unorderly arrival of large numbers of migrants across Europe since 2014 has determined an exceptional mobilisation of resources (often fragmented in multiple small scale and time-limited projects) used to ensure a successful integration of migrants in European societies. Funding has been mobilised at the EU, national, regional and local levels, determining a great number of actions both in policy and in research. After such an emergency response, it is now time to take stock of the work carried out, understanding the impact of the resources used and considering the lessons learnt.

**Scope:** This coordination and support action will draw on specific actions and research in the integration of new migrants in European societies. It assesses the types of practices carried out to address the integration challenges stemming from the migratory crisis in Europe, considering the numerous tools, instruments and actions funded, in policy as well as in research. Lessons from best practices and difficulties will provide policy recommendations from which the EU, national, regional and local governments can draw and share experiences through exchanges with all stakeholders. An online platform structure will be developed to provide European visibility.

Proposals are encouraged to identify, monitor and/or engage with relevant EU projects on migration and integration funded under Horizon 2020, as well as those funded under AMIF, European social Fund and Erasmus+. The collection of new knowledge and innovative practices should include gender-related aspects. It should have a focus on improving the good governance of migrant integration, measuring the impact of the actions implemented, and delivering innovation in support of improved outcomes for both migrants and the communities in which they live. Project participants are encouraged to work in close contact with local, regional and national administrations, or legal entities designated to act on their behalf on the issue of migrant integration.

Proposals should develop participatory techniques to extract policy implications from research findings, with particular regard to past migration related Horizon 2020 projects, including their research teams where relevant. A strong cooperation is specifically essential with consortia involved in the RIAs and IAs of MIGRATION-04, to readily integrate the outputs produced in this forward-looking CSA action.
This should be complemented by strategies for dissemination to relevant stakeholders in view of exploitation of results. An interactive online repository should be set up that can provide for customised searches and reports. The engagement of the public to increase awareness of the added value of European research and innovation activities on migration is encouraged.

The Commission considers that proposals requesting a contribution from the EU in order of 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:** This CSA action will establish a solid and readily accessible evidence base in support of migration and integration policies and will contribute to improved practices for all stakeholders involved, policies and strategies at local, national and EU level, including urban and rural spaces. It will advance the implementation of the EU Urban Agenda and of the UN Sustainable Development Goals dedicated to making cities and rural communities inclusive, safe, resilient and sustainable. Furthermore, the action may contribute to the deployment of migration-related innovation on the market and in society, by highlighting what most works amongst the great number of actions funded over the past years. Finally, it will reduce the R&I division by improving the flow of knowledge in the field between researchers, practitioners and policymakers across Europe.

**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.*

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**Call – Socioeconomic and Cultural Transformations in the Context of the Fourth Industrial Revolution**


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**Specific Challenge:** The challenge is to assess the potential benefits and risks of using disruptive technologies in public administrations as well as the social impact, including the impact on public servants, of using them for government processes and governance (e.g. for registers, for archiving, for tax collection, for decision-making processes etc.). The political, ethical, socio-economic, legal and cultural implications of disruptive technologies and their acceptance are important not only for public administrations, but also for citizens.

**Scope:**

b) Research and Innovation action (2020):
The use of disruptive technologies (such as artificial intelligence and big data analytics, blockchain, Internet of Things, virtual and augmented reality, simulations or gamification) in public administrations and in governance including citizens engagement, decision support systems and policy impact assessments is growing. Although the potential positive impact of such technologies is high, the ways in which they can disrupt the existing landscape of public services and legal procedures and can replace present solutions and processes are largely unknown. As a result, deploying these disruptive technologies in public administration requires experimentations and a thorough assessment of their potential impact, benefits and risks (e.g. excluding some parts of the population due to age / gender / disabilities / social inequality / lack of e-literacy...). This includes especially their ethical and legal consequences. Proposals should pilot the technology and should engage multidisciplinary partners including those from social sciences and humanities, stakeholders and users (both public servants and citizens if appropriate) to examine how emerging technologies can impact the public sector (including the impact on public servants and the relation between public services and citizens) and explore in a wide-ranging fashion the issues surrounding the use of these technologies in the public sector (incl. e.g. the impact on capital, labour and knowledge). One of such issues will be experimenting with Digital Innovation Hubs (DIHs) to engage innovative industrial suppliers such as startups, Govtech and innovative SMEs to pilot the adoption and use of disruptive technologies to improve public services.

Proposals should also lead to the development of implementations and/or business plans that would ensure the long-term sustainability of the services offered based on the used technology.

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 and 4 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 action will enable public authorities to develop pathways for the introduction of disruptive technologies while also addressing the societal challenges raised by such technologies. Based on a thorough understanding of users’ needs, the action will enhance knowledge on digital governance; develop new ways of providing public services, of ensuring public governance and of boosting public engagement with the help of disruptive technologies. It will also contribute to developing new practices, to optimising work processes and to integrating evidence-based decision-making processes in public services and in services such as health, education, culture, social welfare and mobility.

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.
TRANSFORMATIONS-04-2019-2020: Innovative approaches to urban and regional development through cultural tourism

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**Specific Challenge:**

*(2020):*

The various forms of cultural tourism in Europe are important drivers of growth, jobs and economic development of European regions and urban areas. They also contribute to the understanding of other peoples' identities and values by driving intercultural understanding and social development in Europe through discovering various types of cultural heritage. However, although cultural tourism by its nature invites cross border, regional and local cooperation, its full innovation potential in this respect is not yet fully explored and exploited. The level of development of cultural tourism between certain regions and sites, including those between the neighbouring countries in Europe, is still unbalanced. Deprived remote, peripheral or deindustrialized areas lag behind, whereas high demand areas are over-exploited in an unsustainable manner. There is also a significant knowledge gap in terms of quantitative and qualitative data on the phenomenon of cultural heritage tourism and on understanding its contribution to cultural Europeanisation and economic and social development in Europe.

**Scope:**

*b) Innovation action (2020)*

Through exploring possibilities of cultural tourism in Europe’s natural and cultural sites, including those with an industrial heritage, the proposals should propose innovative strategies and pilot solutions for successful and sustainable cross border, regional and local cooperation in cultural tourism, including those for management, training and services. Various options of the use of the EU Structural Investment Funds should be explored. Minority cultures and regions as well as urban areas currently less attractive to cultural tourism should receive special attention in proposed strategies and pilot activities. Further on, proposals should include place-based and participatory approaches to investigate relations between intra-European cultural tourism and Europeanisation and their impacts on identities and sense of belonging. Strategies for cross border cooperation might look beyond EU Member States and Associated Countries and could preferably include partnerships between EU and non-EU countries of the Balkans, the Eastern neighbourhood or the Mediterranean. Proposed solutions should be developed and tested in wide and diversified partnerships of stakeholders. These might include, but not being limited to, entrepreneurs in the tourism industry, SMEs, regional and local governments and municipalities, institutions and organizations representing citizens living in the affected areas. Furthermore, it should cover emerging European networks of heritage sites like the European Heritage Label sites or European cultural routes. Innovative statistical methods, tools and indicators as well as qualitative concepts for measuring and understanding the various impacts of cultural tourism should also be developed and tested.

The Commission considers that proposals requesting a contribution from the EU in the order of EUR 4 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:**

**(2020):**
The action will contribute to improvements in sustainable cultural tourism policies and practices, at various levels, as well as to further progress in growth, jobs, social and economic development of European regions, and in urban and rural areas. It will provide strategic guidance at European level concerning the efficient use of European Structural Investment Funds in this field. It will contribute to the establishment of partnerships between public and private stakeholders, including citizens at large, and will provide strategies and training tools for cooperation in the area of sustainable cultural tourism. Creation of innovative quantitative/statistical as well as qualitative tools and methods will improve available data on and understanding of the impact of cultural tourism on European economic and social development and on cultural Europeanisation.

**Type of Action:** Research and Innovation action, Innovation action

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

**TRANSFORMATIONS-10-2020: Evolving European media landscapes and Europeanisation**

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**Specific Challenge:**
The traditional and social media landscape is changing rapidly. Digitization, the spread of globally interactive delivery platforms, greater emphasis on data, capital concentration, concerns about undue political interference and fake news, plus transformation in journalism and news production are among the triggers for these changes. Media play a crucial socio-cultural and political role through shaping views and aspirations, opinions, political choices and identities. Gap exists in knowledge about the about the nature and implications for Europe as a whole and at the national and regional levels of recent transformation in the European media landscape. The role of contemporary media in fostering process of political and cultural Europeanization through re-shaping towards a European political and cultural representations and identities needs to be better understood. How are major transformations in the media landscape affecting the evolution of a European political and cultural space? Do processes of Europeanization and localisation contradict or complement each other? How are media representations of major European political and cultural issues (like refugees, migration, religions, common history, geopolitical and economic crises, terrorism, sport, elections, etc.) affected by new modes of production, consumption, and by new trends of ownership and control over media content? How have global and European media landscape impacted on specifically European political and cultural markers, symbols and identity elements and on perceptions and attitudes towards
Europe? To what extend does the European media landscape foster or hamper the European project and societal cohesion?

**Scope:** Research on this topic needs to draw on regional, national and European data sources to analyse transformations of the European media landscape from the turn of the 21st century to the current day in the European media landscape in its global context. Where relevant, the research may put recent transformations in historical perspectives, including comparisons with other past ‘media revolutions’. Beyond analysing media production, ownership and eventual censorship, the research should look into the patterns of representation, dissemination and consumption or usage at a certain level of disaggregation, in terms of socio-economic categories and European countries and regions. It should study the contradiction or compatibility of an emerging European Media landscape with an increasing localisation of the content of European Media. The research should provide new knowledge including data concerning the evolution of the spatial and social, including gendered, distribution of media consumption and use. This action should study the impacts of the deep transformations of the media landscape on the prospects and evolution of a common European political and cultural space as well as on the media representations and narratives of major European political and cultural issues, markers, symbols and identity elements.

The Commission considers that proposals requesting a contribution from the EU in the order 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.

**Expected Impact:** Funded projects will fill the knowledge gap, concerning rapid transformations of the European media landscape, in its global context. The action will provide diachronic and synchronic analysis of the European media landscape and its interlaced patterns of production, representation, consumption and appropriation patterns and will produce reliable forecast about its evolution. This RIA, in examining representations and narratives surrounding major issues commonly seen as being of European relevance and significance will deliver a rigorous analysis of how European political and cultural spaces are evolving and of their prospects. It will also improve statistical data and methods of researching concerning contemporary media, drawing as appropriate on, for example, national and international statistical institutes, cultural and media support bodies, national research organisations, networks, research infrastructures and Eurostat. It will aim to equip policymakers with knowledge and effective tools for understanding the impact of the changing media landscape on European politics and on political and cultural Europeanisation.

**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.*
TRANSFORMATIONS-15-2020: Society and innovations: understanding the contexts, processes and consequences

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**Specific Challenge:** The times of social, economic, technological and cultural changes we live in generate opportunities as well as new challenges for people, society and culture. Innovations will bring (assumed) benefits and (perceived) threats. They may bring economic progress but also societal anxieties and feelings of insecurity. **Technological changes will affect employment and production as well as ethics, trust, legal frameworks, decision-making processes, social protection mechanisms, education and learning.** At the same time, society will shape these technological changes. The changes will open discussions on values and identities, principles of democracy, questions of social justice, cohesion and inclusion, knowledge and information and the meaning of work and leisure. There will be changes in the way people communicate with each other (and, increasingly, with machines and robots) and find meaning in their lives. To ensure that future innovations and decision-making are imaginative, culturally and historically informed, **ethically grounded** and context-specific, a knowledge base on the contexts, processes and consequences of innovations is needed.

**Scope:** The proposed research will focus on the ethical, legal, social, economic, educational, gender, cultural, religious and historical contexts and consequences (or impacts) of innovations. Inter- and transdisciplinary research will be promoted for example, on the consequences of the digital turn on democratic values and procedures, political participation, on inequalities (gender, race, ethnicities, etc), societal cohesion, the influence on education and learning, work, employment, entrepreneurship, social protection mechanisms and the Welfare State as well as on identities, gender aspects, legal issues and ethical concerns, cultural practices, the arts, communication media, public discourse, public spaces and security.

The overarching goals will be to analyse, explore and consider solutions to the challenges and opportunities social and technological innovations bring to society. Research will help understand how society and innovations are mutually interdependent and will gauge societies’ capacity for integrating innovations and for dealing with change. One important factor will be to analyse the ways in which democracy and societies’ (sustainable) development is influenced by innovations, bringing historical and cultural perspectives together with visions of the future. Knowledge from transnational social sciences and humanities research, and insights in how culture can shape societies, will allow to assess past and present policy-making on political, socio-economic and cultural repercussions of innovations and inform future policy-making on alternatives. It will enable individuals and societies to cope with the societal transformations and the accelerated paces of change.

The ERA-NET Co-fund Action and the transnational projects funded under the call for proposals will address innovations and technological change from both humanities and social sciences perspectives and will be a laboratory for inter- and transdisciplinary co-creation. They will create new designs for combining qualitative and quantitative methods and will promote dialogue between researchers, innovation actors, policy-makers and civil society.
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 other joint activities including additional joint calls without EU co-funding. The proposal should demonstrate that these co-funded other activities exclude any overlaps with related on-going actions co-funded by the EU under Horizon 2020 Societal Challenge 6 / “Europe in a changing world – Inclusive, innovative and reflective societies”.

The Commission considers that proposals requesting a contribution from the EU of maximum EUR 10 million for a Member States allocation of at least EUR 40 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 ERA-NET Cofund action will effectively strengthen trans-national, pan-European research networking and synergies among national/regional and EU research programmes in the area of humanities and social sciences research. Further synergies of existing networks in this field are expected in regards to new findings on interdisciplinarity. The ERA-NET Co-fund Action will combine the analytic and transformative powers of humanities and social sciences in understanding processes of change and consider solutions when societies face the introduction of innovations. It will create a platform for exchange between research and society. It will contribute to a knowledge base for policymaking and will help formulate more enlightened and effective societal and cultural policies for the future.

It will align national funding strategies and funding on the topic of innovations and their impacts. Projects funded under this call will help to understand the contexts and deep impacts of innovations, drawing lessons from the past, allowing policy makers and societal actors to enter into public discourse and understand and manage the consequences of the digital transformation. The action will enhance inter- and transdisciplinarity.

**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.*

**TRANSFORMATIONS-18-2020: Technological transformations, skills and globalization - future challenges for shared prosperity**

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**Specific Challenge:** The combined effects of technological transformations, of trade and globalisation have created winners and losers in Europe and in the rest of the world. European economies are confronted with the co-existence of skill shortages, high unemployment, increased inequalities in income and wealth, asymmetrical labour mobility
within Europe, as well as emigration and immigration. These structural imbalances need to be addressed, because political concerns in the Western world, and in particular in the European Union, relating to future challenges for shared prosperity are growing, in a context of uncertain futures. Following the assessment of the impact of technological progress, trade and globalisation on skills, employment, inequalities in income and wages and on labour mobility and migration in the EU, realistic and accurate projections into the future on the combined effects of technological progress and globalisation are needed to prepare our economies, societies and policies for what is to come and to build up capacities for influencing these changes.

Scope: Proposals should first measure impact of technological progress, trade and globalisation on skills, employment, inequalities in income and wages and on labour mobility and migration in the EU. It should then project how the interactions between technological change and globalisation will transform the current EU and international structure of labour markets and trade in commodities and services in existing and emerging sectors and their impact on income distribution and social inequalities. Particular attention should be paid to skill-biased, capital-biased, talent-biased and gender biased technical change and to possible trajectories for low-skilled work in the European and international context. The analysis should take into account the evolution of the processes through which technological change is integrated in the human world. This includes economic, institutional, political and socio-cultural contexts, needs and obstacles. The future volume and quality of work should be addressed in relation to skills, education, development, migration and mobility, demographic changes and the analysis of economic convergence and divergence within Europe and with the rest of the world. The challenges of competition, cooperation or conflict with emerging and developing countries need to be be considered. Both demand and supply side issues, including global value chains, off-shoring and their distributive effects, should be addressed in this topic.

Proposals should produce a comprehensive set of scenarios based on data from national and international agencies, from databases on labour markets, inequalities, globalisation, productivity and growth, and from other relevant official sources as needed (no specific/ad-hoc surveys should be used). The analysis should have a strong focus on disentangling the processes of technological change and of globalisation in important sectors of the economy to assess their impacts on inequalities, and their implications on the development of skills and competences that need to be strengthened in Europe, in order to reduce the uncertainty facing large sections of the population In addition, proposals should identify priority areas and content for policies that would make share the benefits of technological change and globalisation more equally and widely. For instance, proposals could map pathways for adapting working populations and their flows to trends in the international production and consumption structure. Paradigm changes needed in education, skill and talent development could be anticipated. Due to the specific challenge of this topic, participation of relevant partners from third countries, including developed, emerging and developing countries, is encouraged. This participation would enable a balanced discussion on competing points of view that are critical for the impact of the project. A solid dissemination strategy should be foreseen for bringing findings to the attention of policymakers and into the public domain.
The Commission considers that proposals requesting a contribution from the EU in the order 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.

**Expected Impact:** Results will contribute to inclusive and evidence based policy choices and informed public debates, especially on methods and processes of upgrading skills, mobility and labour markets. It will propose policies on the areas discussed above for different levels of national and international governance and the means of achieving multilateral cooperation on these objectives.

**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.*

**DT-TRANSFORMATIONS-21-2020: Mentoring scheme for schools: mainstreaming innovation by spreading the advanced ICT-based teaching practices to a wide circle of schools**

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**Specific Challenge:** Education, in particular at school level, has to keep the pace with the digital transformation of our society. While some schools have a culture of well-developed ICT strategies and pursue very innovative practices, they often work in isolation and there is a growing digital gap between schools that are advanced and those who are not leveraging the advantages of ICT-based pedagogies. The greatest challenge is to mainstream digital innovation in education that contributes to improve educational performance and school climate, reaching the less advanced schools and teachers. To accelerate the digital transformation of schools in Europe, there is a need for sharing, discussing, spreading and adopting innovative practices, supporting a whole-school approach and promoting a model of school mentoring. This requires implanting and fostering a broader culture of innovation and leveraging networks and hubs of innovation to help disseminate and widely diffuse best practice involving ICT. Accelerating digital transformation in education and delivering high-quality digital education to all students requires bridging this gap and accelerating change by diffusing innovative ICT-based educational practices across schools and stimulating bottom-up diffusion of innovation through school-to-school peer-learning.

**Scope:** the action will build, coordinate and seek to expand an inclusive pan-European network of schools where schools (school leaders and teachers) interested in pedagogical uses of ICT can build their know-how by learning from their more advanced peers through demonstrations of best pedagogically sound practice. The action will in particular focus on mainstreaming the innovation process, which leads to positive results, using a policy-connected approach by involving policy-makers at regional and national level. The action will also include bottom-up, regional grassroots actions that support the situated take up of ICT
and ICT-based practices between schools with various levels of technological proficiency, particularly within countries where mainstreaming of innovative use of ICT in schools is still at a relatively low level and paying attention to contexts where such patterns of cooperation are not yet prevalent. The action will particularly: 1) collect and document evidence of cases where whole-school peer-learning methodologies have been successfully used in the Member States, and the associated ones, with a view to further scaling-up, and also compare them with less successful cases 2) build on and involve the existing networks, ‘multiplier’ structures and regional hubs to mainstream change; 3) set up collaboration between more advanced and less advanced schools and support the exchange or practice with instructional design, paying attention to their specific educational contexts; 4) leverage an EU-level awareness-raising platform or infrastructure to promote the idea and models of mentoring scheme; actions may propose using existing platforms to save resources for other activities 5) explore which incentives and rewards for advanced schools make it attractive for them to participate as mentors in school clusters to mainstream their innovative practices 6) will support the development of whole-school approaches to ICT deployment and the mainstreaming of innovative practice involving ICT in schools across Europe 7) provide a strategy and a plan how to achieve greatest impact possibly by involving institutional actors such as Ministries of Education and disseminate the model of mentoring among schools.

The Commission considers that proposals requesting a contribution from the EU in the order 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.

**Expected Impact:** The proposals should provide meaningful and ambitious indicators on how the whole requested range of impacts will be measured, including the improvements resulting from the digital innovation actions, as well as the number of countries and schools to be reached.

A significant number of schools connected and supported by the network to exchange best practices and develop a whole-school approach involving all levels of school governance to implementing ICT and a significant number of policy-makers and educational stakeholders provided with actionable guidance on how to successfully mainstream a culture of innovation across European schools.

**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.*

**TRANSFORMATIONS-22-2020: Enhancing access and uptake of education to reverse inequalities**

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**Specific Challenge:** Inequalities have been rising over several decades in s Europe in spite of increased levels of welfare and public spending as a proportion of GDP. Growing inequality is
a threat to economic growth, democracy and equal opportunities for future generations. Social disadvantages and precariousness are to a large extent inherited whereby low educational attainment of both parents and children play a key role. There is ample evidence that children from less privileged social backgrounds trail behind in access and uptake of education. Often disadvantages such as low-skilled parents, mono-parental families, limited access to social services (e.g. health and housing), and cultural resources, and being from a migration background, cumulate. The challenge is to reverse this trend and to enhance upward social mobility by significantly improving access and uptake of education in Europe, in line with the European Pillar of Social Rights.

Scope:

a) Research and Innovation Action:
The research will focus on access and uptake of education from early childhood to adult education using the most appropriate methods and approaches. Education should be understood comprehensively, including formal and informal education publicly or privately provided. Any means of knowledge, skills and competences acquisition should be considered. The research should take into account the increasing diversity in Europe and complex interplay of the socio-economic status of parents, family configuration, geographical location, ethnicity, religion, language, traditions, cultural values, gender, disabilities, special educational needs, as well as differences between urban and rural environments. The diversity requires moving from standardisation to customisation and cross-sectoral policies as well as the involvement of multiple stakeholders. Research will refine and develop necessary quantitative and qualitative data, learn lessons from existing policies to combat inequalities across a number of policy fields, and propose new or differentiated policies where needed. Proposals should build on the evidence of the successful contexts in which practices are demonstrating to be effective, considering the diversity of structures and agents influencing the access and uptake of education. The Commission considers that proposals requesting a contribution from the EU in the order of EUR 3.5 million would allow this specific challenge to be addressed appropriately. This does not preclude submission and selection of proposals requesting other amounts.

b) Coordination and Support Action
The Coordination and Support Action will run in parallel to the research and innovation actions and interact with them to enhance synergies and cooperation between them and amongst the relevant stakeholders (including policy makers at all levels in the relevant policy fields,) and decisively promote the policy uptake of the research to overcome inequalities. It will generate networks for research and policy development and promote and monitor concrete policy guidance for system-wide, integrated and - where necessary – cross-policy strategies for effective intervention.

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

Expected Impact: The RIA action will support the advancement and uptake of effective and efficient practices in order to reverse inequalities, increase access to quality education for disadvantaged groups, improve uptake of education in key competences (reading, maths, sciences, digital skills), reduce the impact of social disadvantage and thereby increase social upward mobility in Europe. It will produce research results on access and uptake of
education and formulate policy recommendations in a cross-sectoral approach and by involving multiple stakeholders. It will deliver best practices and new methodologies (where appropriate), which can be scalable and replicable by other projects and stakeholders. The action will support the breaking of policies and intervention silos toward more cooperation amongst stakeholders.

The Coordination and Support Action will draw policy lessons from previous topics in this field, bring together through networks and conferences different stakeholders and coordinate their efforts to draw policy recommendations and impact lessons that can be implemented. The network structure should enable the sustainability over time of the policy process.

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

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

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**Call – Governance for the Future**

**DT-GOVERNANCE-05-2018-2019-2020:** New forms of delivering public goods and inclusive public services

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**Specific Challenge:** Governance is being transformed by new approaches to delivering public services which allow for the involvement of citizens and various other actors. The challenge is to critically assess and support as needed this transformation based on an open collaboration and innovation platform supported by ICT (‘government as a platform’) and on an open environment and ecosystem with clear frameworks and guidelines for modular services quality (‘government as a service’) in accordance with the EU eGovernment Action Plan 2016-2020 and the European Interoperability Framework Implementation Strategy. In addition, how can public-private partnerships, big data and algorithms also reduce 1) the legitimacy of public services, and 2) potential bias in how these services are offered when informed by algorithms and big data.

In particular, **to deliver better (and ethical) public services**, public administrations need to regroup resources together under common infrastructures at the European level that serve the needs of various actors and enable the participation of all relevant communities including elderly people, people with disabilities and migrants. Mobile apps providing access to public services are likely to become the norm to facilitate the interaction and engagement of citizens with public administrations. In addition, to ensure a cost efficient provision of inclusive digital services, there is a pressing need to identify gaps in accessibility solutions, to identify related good and bad practices, and to promote training, awareness raising and capacity building.
Scope: In a context of open government and digital democracy, the role of the government is changing due to its use of ICT and to the increasing pervasiveness of ICT across all parts of society. In addition to being a manager of societal assets, government is becoming a provider of tools, opportunities, guidance and incentives for co-creation as well as a guarantor of public values over the longer term.

c) Research and Innovation action (2020)

Proposals should analyse, develop and demonstrate the potential for sharing common services with different actors (public and private and third sectors) to achieve efficiency and effectiveness in these collaborations, in particular leveraging mobile communications and Apps. The proposals should also evaluate the role, legitimacy and responsibility of the public authorities and of the other actors delivering public goods and services in the new governance model and the related partnerships, including in terms of ensuring secure mobile single sign-on for cross border access and use of services. Evidence of the benefits of the full implementation of the once-only and digital-by-default principles and user centricity and the transformative impact of new technologies should also be taken into account. Proposals should also lead to the development of implementation and/or business plans that would ensure the long-term sustainability of the new governance model. They should engage multi-disciplinary and multi-sectoral teams to explore the complexity of this challenge and to identify the necessary changes as well as the legal, cultural and managerial risks and barriers to its implementation.

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 and 4 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: Solutions for opening up and connecting public administration data and services will have a measurable impact for both businesses and citizens, leading to efficiency gains. The actions will provide for all the elements required to facilitate the migration of public administrations towards forward-looking models, in particular mobile ones, for the co-delivery of public services.

The actions will provide evidence of how the open government approach may reinforce trust in public institutions, which is strongly associated with citizens’ satisfaction from full deployment of inclusive digital government. The actions will also contribute to establishing a culture of co-creation and co-delivery, transparency, accountability and trustworthiness as well as of continuous consultation promoting overall digital accessibility.

In addition, to support the implementation of the Web Accessibility Directive, enhanced cooperation on digital accessibility between various stakeholders will result in scalable and more affordable accessibility solutions. Overall, the actions will contribute to the widespread recognition of the need for and benefits of an inclusive Digital Single Market.

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.
SU-GOVERNANCE-09-2020: Addressing radicalization through social inclusion

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**Specific Challenge:** The spread of radical ideologies leading in some cases to violence has prompted the EU and its Member States to develop prevention policies and effective intervention scenarios supporting social inclusion. To further develop and proactively target the needs of policymakers and practitioners, a comprehensive evidence base analysis on trends in radical ideologies and extremism and on the drivers of polarisation and radicalisation is necessary.

**Scope:** Based on empirical and multidisciplinary approaches, proposals should assess the multiple drivers and manifestations of radical ideologies prone to incite or lead to violence, both societal (including religious) and political, as well as the physical and online contexts for their propagation. Complementary knowledge on non-radicalising identity, belonging, disengagement and detachment should also be formulated in order to provide a holistic framework for assessing and proposing preventive measures in terms of social policies and interventions. A focus should be on the psychological and social mechanisms of alienation and radicalisation of youth in urban and peri-urban contexts. Research should develop new methodologies, where appropriate and evidence based policy recommendations in close collaboration with civil society and policy makers. Proposals should rely on extensive fieldwork and construct a solid empirical base. **Research must consider gender perspective where relevant.**

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

**Expected Impact:** Actions should provide a holistic evidence base to support situation analysis. They will increase the capacity to quickly identify and actions should provide comprehensive data bases, evidence based analysis and sector scenarios to support holistic situation analysis. They should increase the capacity to quickly identify and reach at-risk groups and thereby contribute to better targeted and more effective policies and interventions, as well as identify their optimal implementation tools. The ultimate goal is to increase awareness and resilience in at-risk demographics and introduce preventive, countering and de-radicalisation approaches as applicable. Where applicable the proposals should demonstrate how they will effectively build on the relevant previous and on-going EU funded (including but not limited to the Horizon 2020 both Societal Challenge 6 and 7, and Internal Security Fund - Police) radicalisation projects.

**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.*
DT-GOVERNANCE-12-2019-2020: Pilot on using the European cloud infrastructure for public administrations

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Specific Challenge: Given the complexity of our societies, public authorities need innovative means and tools that can enable them to develop better evidence-based policies. The development of such policies needs to involve local actors such as citizens and businesses, in order to better inform policy-making while ensuring higher levels of acceptance for policies and of trust in the authorities. Data analytics and usage of cloud infrastructure to gain access to shared data can help improve policy making at all levels, national but also local. Moreover, engaging citizens and local actors in the generation of data or in the analysis of ‘big data’ and its ethical issues can assist local governance.

Scope: The availability of open and big data, in particular as facilitated by high-performance computing (HPC) capabilities offered by the European Cloud Initiative, would provide an infrastructure with data and analytical power for the public administration. Proposals should develop new ways and methods and ethical aspects of using the cloud infrastructure by public administrations for policy modelling, policy making and policy implementation. They should also create reusable models that allow for a better, more accurate and more efficient development and management of policies related to health, emergency responses, weather warning etc.

Proposals should demonstrate the interoperability, reusability or scalability of the models and analytical tools.

They should also develop a solid and realistic business plan to ensure the long-term sustainability and take-up of the results. They should consider the different legal, ethical and security aspects of the models and analytical tools, depending on what kind of data they contain/are based on. They should also consider how communities can be effectively involved in co-creation of data management and analysis. In addition, they should involve multi-disciplinary and multi-sectoral teams to explore the complexity of this challenge, including the problems raised by big data uses and consideration of precautionary approaches to address such problems.

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 and 4 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 action will create analytical tools that enable public administrations to reuse common infrastructures and data sets for the development of better targeted and more effective evidence-based policies. It will engage citizens and businesses in the co-creation of the tools, thereby enhancing trust and boosting the perceived legitimacy of authorities.
Type of Action: Innovation action

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

**GOVERNANCE-20-2020: Centres/Networks of European research and innovation**

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**Specific Challenge:** To extend the network of (currently three) centres in the world’s most dynamic and innovative countries and regions that connect and support European researchers and entrepreneurs globally, in order to establish their presence in third countries and strengthen the position of Europe as a science, technology and innovation leader.

This call topic builds on the results of the 2016 Call topic ENG-GLOBALLY-09-2016, focusing specifically on innovation.

**Scope:** To establish new centres, or networks of centres, in close cooperation with local technology and innovation structures located in third countries and regions.

A maximum of three proposals will be supported including one for India and one for Africa. These centres/networks will engage in activities with a focus depending on the country/region addressed, including activities such as:

- Providing services such as incubator co-working space, advice and support directly to European innovators that want to soft-land in the partner country/region and/or **to engage in co-creation with local innovators**;
- Building/linking to an eco-system of stakeholders including early adopters, potential customers, partners etc. in the country/region;
- Supporting the transfer and internationalisation of demonstrated technologies and know-how, both to and from the country/region;
- Launching local market development programmes to deploy European technology;
- Offering mentorship, training and promoting staff exchange to increase capacities of innovators;
- Leveraging private and public investors’ resources to sustain the activities of the centre(s).

The proposed work should seek to establish the centres/networks in cooperation with local actors based on a sound business plan that is expected to include clear commitments from multiple funding sources, such as corporates, investors, or local governments making available soft-landing spaces. The business plan and the intended governance (including type of legal entity to be established) shall be presented as part of the proposal. The involvement of European and local incubators or accelerators must be described.

Each proposal shall target one country or region that is an emerging or developing technology or innovation partner; proposals addressing India and all or part of Africa are strongly encouraged without excluding other countries with similar characteristics.
For India, the centre(s) should target mature start-ups and SMEs from both Europe and India and promote matchmaking for adaptation of European technologies and innovative solutions to the Indian context.

For Africa the centre(s) with the network of incubators and accelerators should target at least five sub-Saharan African countries, build on existing local incubators and accelerators, and focus on technology transfer/adaptation (from Europe to Africa or vice-versa), staff exchanges and training.

Consortia are expected to include business development as well as technology expertise in the target country or region and ensure adequate involvement of European stakeholders from existing structures in the addressed countries/regions. Proposals should build on previous work of bilateral and regional international cooperation projects where appropriate.

The Commission considers that proposals requesting an EU contribution of around EUR 2-3 million for a duration of 3-4 years would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Under this topic, legal entities established in the target country/region are eligible for funding from the Union.

**Eligibility and admissibility conditions:** Under this topic, legal entities established in the target country/region are eligible for funding from the Union.

**Expected Impact:**
- Reinforced cooperation between European innovators and those of the Union’s international partners;
- Higher visibility and prestige for European research and innovation and its actors in international partner countries/regions;
- Stronger presence of European organisations in the innovation environment of the partner country/region;
- Enhanced impact of results from research and innovation projects, including those under Horizon 2020, through increased access to excellence and to markets across the world.

**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.*

**SU-GOVERNANCE-21-2020: Developing deliberative and participatory democracies through experimentation**

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**Specific Challenge:** Liberal democracies have come under pressure in recent times. Political distrust, polarizing discourses, lower electoral participation and populist narratives that
reject the idea of an open society manifest themselves in Europe and beyond, with very strong support. The challenge therefore is to examine whether and how deliberative and participatory approaches – theoretically and practically – can fulfil the promise of greater and more enlightened participation in the present context and reach out to include those alienated from the political process. The difficulties deliberative and participatory approaches may face are also important to appraise.

In the last two decades deliberative and participative democracy has become increasingly prominent as a response to the challenges besetting liberal representative democracies. Premised on notions of direct democracy, active citizenship and decisions reached through argumentation, these new practices of democracy has in theory the potential to revive democratic legitimacy and help close the gap between citizens and political elites, who are often perceived as representing powerful interest groups.

Scope: Research should elucidate the complex links between political discourses and identities (including populistic standpoints), dialogue guided by reasoned argumentation and the potential for achieving consensus on policy choices. Projects should also consider issues pertaining to effective participation in deliberative and participatory processes (especially as regards vulnerable groups and the politically less active) and as to how effectively these are translated by governments and institutions into concrete action. Research should equally examine how deliberative and participatory processes relate to polarisation and how (or if) it can assist in reaching mutual understanding among citizens with different views and positions. Lastly, attention should be paid to how deliberative and participatory democracy can best complement representative institutions. Issues of coordination, complementarity, scaling up (of such practices) but also opening up more traditional representative institutions should be examined.

The impacts of technology need to be further illuminated. Re-evaluating and re-assessing the contribution of digital technology in implementing deliberative, participatory (and by extension direct) democracy is needed. Projects should offer exhaustive assessments of experiments and innovations in deliberative and participatory processes highlighting success and failure factors. The role of the internet should equally be examined (also in connection to social media) in light of recent trends, which have cast doubt on its capacity to act as a platform of rational communication between equal participants.

In the EU context, the notion of the public sphere, as a key deliberative element, should be reconsidered both conceptually and empirically in view of the economic, social and political crises and developments of recent years. This includes a reappraisal of the question whether there is, could, or should be a European public sphere, which could enrich the democratic quality and the liberal character of the EU, in a context where supra-national European institutions are often perceived as insufficiently democratic and transparent.

Research should examine how the concept of deliberative and participatory democracy could be used and adapted to facilitate such a process and whether and how it is compatible with polarization tendencies, which have been prevalent in recent years. It needs to be investigated whether these new trends contribute to social justice, how societies can be made not only more inclusive but also more reflective, and how critical capacity and attitudes can be developed which revive deliberative democratic discourses. In this context, the contribution of the education system needs to be worked out. Connections should be made with questions of (European) identity, whereby the focus should not lie on an essentialist conception of identity, but reflexive identity, which signifies a critical and transformative self-understanding. Research should investigate how to create arenas or
spaces open to citizens which are conducive to collective decisions made through public deliberation. Cooperation with partners from third countries, from both established and emerging democracies, is encouraged in order to have comparative perspectives that would be an important value added for the impact of the project.

A set of concrete actions could look at experimental and participative approaches to civic and social life, and suggest pathways for strengthening democracies at all levels, in terms of concrete actions, pilot projects and experimentation. They could build on previous results of international, European and other projects in these areas. In a context where citizen involvement and citizen participation in research and innovation is strongly stressed for Horizon Europe, this proposal could help to lay the groundwork.

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

**Expected Impact:** This action will move to another level our understanding of deliberative and participatory democratic processes and identify ways of how they can be improved in practice. Research should make this action on how to create arenas or spaces open to citizens which are conducive to collective decisions made through public deliberation. Proposals should outline methods and policies by which democratic practices can be strengthened in order to rebuild trust in political, economic and social institutions.

**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.*

**DT-GOVERNANCE-22-2020: Citizen-centric public services in local and regional administrations**

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**Specific Challenge:** With the adoption of the Tallinn Declaration, the ministers in charge of policy and coordination of digital public services in the countries of the EU and EFTA, recognise the needs and expectations of the citizens and businesses when interacting with public administrations and commit that the design and delivery of their services will be guided by the principles of user-centricity.

The digital transformation of the public administration shall be implemented at national, regional and local levels.

**Scope:** For user-centric digital public services, the proposed action will:

1. support the implementation of the 'User-centricity principles for design and delivery of digital public services' laid down in the Tallinn Declaration putting citizens truly at the heart of governments' digital transformation at cities and regions level;
2. encourage and recognise cities and regions that are taking policies steps to become more user-centric;
3. promote capacity building, best practices and experience exchange, solutions reuse, training, awareness raising through a community building approach;
4. ensure that the mechanism for recognising user-centric cities and regions and the community will become self-sustainable beyond the H2020 funding.

The Commission considers that proposals requesting a contribution from the EU in the order of 1.5M€ 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 action will show the social and human dimension of digitalisation, in particular that all citizens can be better served by their public administrations while moving into the digital age, and will strengthen European citizens’ sense of belonging to the European Union.

By developing a framework that will determine the conditions by which cities and regions will be recognised in their commitment to become more user centric the belief is that across Europe public administrations will be inspired to accelerate their journey to design and deliver more user-centric digital public services for the benefit of their citizens and businesses.

The action should emphasise the movement of local and regional administrations towards citizen centric, secure, high quality and burden free public services and towards more inclusive and participative decision and policy-making. At the same time cities and regions will gain visibility and benefit from being part of the community through exchange of good and bad practices, solutions and know how among all cities and regions experiencing the same journey.

**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.*

**GOVERNANCE-23-2020: Support to the networking of national R&I Think Tanks for helping co-shape and share a common perspective on R&I policy across Europe**

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**Specific Challenge:** The intended new governance of R&I policy at EU level relies on a combination of co-creation across policy fields and co-design with relevant stakeholders, as part of an open, transparent and cooperative relation between science and society. This implies developing a shared understanding and common views on policy challenges and opportunities based on sound evidence and continuous exchanges with policy advisors and shapers active at national level. In that regard, there is a need to help the transparent networking of R&I Think Tanks across the EU to strengthen and enlarge their input to the co-design of R&I policy.
Scope: The coordination and support action should support the networking of R&I Think Tanks across the EU, with the aim to inform EU and national policy-making and help develop and share common views needed for co-designing the EU R&I policy. Proposals should demonstrate the capacity to develop existing informal or self-organised collaborations across national Think Tanks and/or R&I policy advisers into an actual European network of R&I Think Tanks, to achieve efficiency and effectiveness in codesigning R&I policies. The network should bring together think tanks or advisory communities already organised at national level, and increase their cross-border collaboration and capacity to deliver strategic policy advice at European level. The network should aim at enhancing trust and coherence amongst its members, through transparent, open and collaborative processes involving national and European policy-makers, research and innovation communities and citizens. While the new network should help shape and spread new ideas about EU R&I policy, it should also capture and discuss emerging trends to make R&I policy more impactful and develop methodologies and approaches for co-designing policies with a clear EU added value.

Specific objectives of this action:
1. The network will greatly increase the capacity and diversity of R&I policy advice available in each Member State, by opening up the possibility for national Think Tanks to source or discuss expertise and advice from Think Tanks in other Member States.
2. The network will allow to rapidly bringing to the fore and debating new R&I policy concepts, through e.g. an annual event, in view of developing a common understanding and supporting the coherence of policy making processes across the EU.

The Commission considers that a consortium requesting a contribution from the EU in the order of EUR 0.5 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: Opening up and connecting policy advisers and R&I communities will add value to the governance of the European research and innovation system, will have a measurable impact for policy makers, R&I communities and citizens, and will lead to policies with more relevance and impact.

In the short term, the action will reinforce network collaboration between national R&I policy advisers, with the prospect in the medium term to offer a sounding board for national and EU policy-makers alike. In the longer term, it will facilitate the strategic alignment of R&I policies in Europe by supporting the uptake and dissemination of research and innovation best practices and questioning.

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.
Societal Challenge 7: Secure Societies – Protecting freedom and security of Europe and its Citizens

Call – Protecting the infrastructure of Europe and the people in the European smart cities

SU-INFRA01-2018-2019-2020: Prevention, detection, response and mitigation of combined physical and cyber threats to critical infrastructure in Europe

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**Specific Challenge:** Disruptions in the operation of our countries’ critical infrastructure may result from many kinds of hazards and physical and/or cyber-attacks on installations and their interconnected systems. Recent events demonstrate the increase of combined physical and cyber-attacks due to their interdependencies. A comprehensive, yet installation-specific, approach is needed to secure existing or future, public or private, connected and interdependent installations, plants and systems. Budgetary constraints on both the public and private sectors mean that new security solutions must be more accurate, efficient and cost-effective, and possibly more automated than the ones currently available.

**Scope:** Proposals should cover: forecast, assessment of physical and cyber risks, prevention, detection, response, and in case of failure, mitigation of consequences (including novel installation designs), and fast recovery after incidents, over the life span of the infrastructure, with a view to achieving the security and resilience of all functions performed by the installations, and of neighbouring populations and the environment.

They should:
(a) assess in detail all aspects of interdependent physical (e.g. bombing, sabotage and attacks with a variety of weapons against installations, buildings and ships; plane or drone overflights and crashes; spreading of fires, floods, landslides, disastrous consequences of global warming, seismic activity, space weather, combined threats, etc.) and cyber threats and incidents (e.g. malfunction of SCADA system, non-authorised access of server, electronic interference, distributed attacks), and the cascading risks resulting from such complex threats,
(b) demonstrate the accuracy of their risk assessment approach using specific examples and scenarios of real life and by comparing the results with other risk assessment methodologies,
(c) develop improved real-time, evidence-based security management of physical and cyber threats, taking account of the ageing of existing infrastructure, and
(d) provide scenarios and recommendations for policy planning, engagement of the civil society, and investment measures encompassing all aspects of prevention-detection-response-mitigation

Innovative methods should be proposed for sharing information with the public in the vicinity of the installations - including through social media and with the involvement of civil society organisations - for the protection of first responders such as rescue teams, security teams and monitoring teams, and for ensuring service continuity.

In 2018 and 2019, they should focus on any type of installation belonging to one of the following critical infrastructures: water systems, energy infrastructure (power plants and distribution, oil rigs, offshore platforms), transport infrastructure (airports, ports, railways, urban multimodal nodes), communication infrastructures and ground segments of space systems, health services, e-commerce and the postal infrastructure, sensitive industrial sites and plants, and financial services.

In 2020, while keeping the coverage of the assessment of risks, prevention, detection, response and mitigation of consequences, proposals should also address the interrelations between different types
of critical infrastructure with the objective of developing tools and methods to minimise cascading effects and allow rapid recovery of service performance levels after incidents. When selecting for funding the proposals submitted in 2018 or 2019 or 2020, the Commission will take due account of similar projects financed in the previous years since 2016, with a view to cover the largest possible spectrum of installations. Each year, a list of infrastructures excluded from the Call will be published on the Funding and Tenders Portal. Consortia should involve the largest variety of relevant beneficiaries, including infrastructure owners and operators, first responders, industry, technologists and social scientists, etc. The participation of SMEs is strongly encouraged. In line with the EU's strategy for international cooperation in research and innovation international cooperation is encouraged, and in particular with international research partners in the context of the International Forum to Advance First Responder Innovation in which the Commission has decided to participate. The centre of gravity for technology development with actions funded under this topic is expected to be up to TRL 7 — see General Annex G of the Horizon 2020 Work Programme.

Indicative budget: The Commission considers that proposals requesting a contribution from the EU of about EUR 7 to 8 million would allow this topic to be addressed appropriately. Nonetheless this does not preclude the submission and selection of proposals requesting other amounts.

**Expected Impact:**

**Short term:**
- State-of-the-art analysis of physical/cyber detection technologies and risk scenarios, in the context of a specific critical infrastructure.
- Analysis of both physical and cyber vulnerabilities of a specific critical infrastructure, including the combination of both real situation awareness and cyber situation awareness within the environment of the infrastructure.
- In situ demonstrations of efficient and cost-effective solutions to the largest audience, beyond the project participants.

**Medium term**
- Innovative (novel or improved), integrated, and incremental solutions to prevent, detect, respond and mitigate physical and cyber threats to a specific Critical Infrastructure.
- Innovative approaches to monitoring the environment, to protecting and communicating with the inhabitants in the vicinity of the critical infrastructure.
- Security risk management plans integrating systemic and both physical and cyber aspects.
- Tools, concepts, and technologies for combatting both physical and cyber threats to a specific critical infrastructure.
- Where relevant, test beds for industrial automation and control system for critical infrastructure in Europe, to measure the performance of critical infrastructure systems, when equipped with cyber and physical security protective measures, against prevailing standards and guidelines.
- Test results and validation of models for the protection of a specific critical infrastructure against physical and cyber threats.
- Establishment and dissemination throughout the relevant user communities of specific models for information sharing on incidents, threats and vulnerabilities with respect to both physical and cyber threats.

**Long term**
- Convergence of safety and security standards, and the pre-establishment of certification mechanisms.
- Secure, interoperable interfaces among different critical infrastructures to prevent from cascading effects.
- Contributions to relevant sectorial frameworks or regulatory initiatives.
Type of Action: Innovation action

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

Call – Artificial Intelligence and security: providing a balanced assessment of opportunities and challenges for Law Enforcement in Europe

SU-AI01-2020: Developing a research roadmap regarding Artificial Intelligence in support of Law Enforcement

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Specific Challenge: As indicated in the Coordinated Plan on Artificial Intelligence and in the Cybersecurity Joint Communication, there is a need to better understand: how AI-based systems, services and products could enhance the objectives of the security sector; how AI technologies can be protected from attacks; how to address any potential abuse of AI for malicious purposes; how to establish cybersecurity requirements for AI. From the Law Enforcement point of view, these dimensions have to be analysed in a longer term, taking into account that the potential AI benefits for Law Enforcement Agencies (LEAs) are threefold, i.e., through: 1) proactive policing (from reactive to anticipative policing); 2) data analysis (e.g., connecting the dots, discovering criminal patterns and defragmenting LEA actions), and 3) identity checks (improving detection, targeting and interdiction).

Scope: Proposals under this topic should provide an EU AI roadmap for LEAs, meeting their specific operational and cooperation needs, by identifying, in a longer-term perspective: the key areas in which AI would be beneficial for LEAs, the key areas in which it could pose a threat to security, cybersecurity requirements for AI based technologies in use or to be used by LEAs as well as means of prevention and mitigation of malicious use of AI for criminal activities. As such this project would not only need to continuously interact (in a cluster mode) with projects funded under SU-AI02-2020 and SU-AI03-2020 but also provide recommendations for further work to be done under Horizon Europe, Digital Europe, or the Internal Security Fund as well as for policy and market uptake. The objective is to develop a research roadmap that provides answers to, e.g., following questions: What are and will be the AI needs of LEAs in their daily work? What are the major research gaps in the area of AI in support of LEAs? What are the challenges that need to be addressed, both from the fighting crime, including cybercrime and terrorism, and from improving cybersecurity (re)actions? Which approaches might be desirable? What needs to be set up for test and evaluation? How to prevent and mitigate malicious use of AI for criminal activities and terrorism?

Starting from these considerations, proposals must demonstrate commitment to produce recommendations that are updated continuously, and at least every 6 months, about the following lines of actions: which AI based technologies, systems and solutions could support/enhance the work of LEAs and how, what the corresponding restraints (including ethical and legal) are, as well as related risks, security challenges and protection measures. The proposal shall provide specific real-life LEAs scenarios, examples and evidence supporting their recommendations. The proposing consortium is expected to incorporate relevant security practitioners, researchers, civil society organisations and LEAs.
As indicated in the Introduction of this call, proposals should foresee resources for clustering activities with other projects funded under this call to identify synergies and best practices. The Commission considers that proposals requesting a contribution from the EU of around EUR 1.5 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: Short term:
- Effective contribution to the overall actions of this call;

Medium and longer term:
- In the longer term perspective, identification of key areas in which AI would be beneficial for LEAs, meeting their operational and collaborative needs, and of key areas in which it could pose a threat to security;
- A carefully planned roadmap in order for Law Enforcement to benefit as much as possible from the AI based technologies, systems, solutions, including their protection;
- Increased awareness regarding the state of the art and trends in AI-based criminal activities (short-, mid- and long-term).

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.

SU-AI02-2020: Secure and resilient Artificial Intelligence technologies, tools and solutions in support of Law Enforcement and citizen protection, cybersecurity operations and prevention and protection against adversarial Artificial Intelligence

SwafS Key Word(s) | Ethics, Gender Equality, Responsible Research and Innovation (RRI)
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Deadline | 27 August 2020 17:00:00 Brussels time
Topic Information | Link

Specific Challenge: The increasing complexity of security challenges, as well as more and more frequent use of AI in multiple security domains, such as fight against crime, including cybercrime and terrorism, cybersecurity (re-)actions, protection of public spaces and critical infrastructure makes the security dimension of AI a matter of priority. Research is needed to assess how to mostly benefit from the AI based technologies in enhancing EU’s resilience against newly emerging security threats (both “classical” and new AI supported) and in reinforcing the capacity of the Law Enforcement Agencies (LEAs) at national and at EU level to identify and successfully counter those threats. In addition, in security research, data quality, integrity, quantity, availability, origin, storage and other related challenges are critical, especially in the EU-wide context. To this end, a complex set of coordinated developments is required, by different actors, at the legislative, technology and Law Enforcement levels. For AI made in Europe, three key principles are: "interoperability", “security by design” and “ethics by design”. Therefore, potential ethical and legal implications have to be adequately addressed so that developed AI systems are trustworthy, accountable, responsible and transparent, in accordance with existing ethical frameworks and guidelines that are compatible with the EU principles and regulations.

Scope: Proposals under this topic should aim at exploring use of AI in the security dimension at and beyond the state-of-the-art, and exploiting its potential to support LEAs in their effective operational cooperation and in the investigation of traditional forms of crime where digital content plays a key role, as well as of cyber-dependent and cyber-enabled crimes. On the one hand, as indicated in “Artificial Intelligence – A European Perspective”, AI systems are being and will increasingly be used
by cyber criminals, so research into their capabilities and weaknesses will play a crucial part in defending against such malicious usage. On the other hand, Law Enforcement will increasingly engage in active usage of AI systems to reinforce investigative capabilities, to strengthen digital evidence-making in court and to cooperate effectively with relevant LEAs. Consequently, proposals should:

- develop AI tools and solutions in support of LEAs daily work. This should include combined hardware and software solutions such as robotics or Natural Language Processing, in support of LEAs to better prevent, detect and investigate criminal activities and terrorism and monitor borders, i.e., opportunities and benefits of AI tools and solutions in support of the work of Law Enforcement and to strengthen their operational cooperation.

Building on existing best practices such as those obtained through the ASGARD project, proposals should establish a platform of easy-to-integrate and interoperable AI tools and an associated process with short research and testing cycles, which will serve in the short term perspective as a basis for identifying specific gaps that would require further reflection and development. This platform should, in the end, result in a sustainable AI community for LEAs, researchers and industry as well as a specific environment where relevant AI tools would be tailored to specific needs of the security sector, including the requirements of LEAs. Those AI tools would be developed in a timely manner using an iterative approach to define, develop and assess the most pertinent digital tools with a constant participation of end-users throughout the project. By the end of the project, the platform should also enable a direct access for Law Enforcement to an initial set of tools. Specific consideration should be given to the issue of setting an appropriate mechanism to enable a proper access to the relevant data necessary to develop and train AI based systems for security.

Proposals should also:

- develop cybersecurity tools and solutions for the protection of AI based technologies in use or to be used by LEAs, including those developed under this project against manipulation, cyber threats and attacks, and;
- exploit AI technologies for cybersecurity operation purposes of Law Enforcement infrastructures, including the prevention, detection and response of cybersecurity incidents through advanced threat intelligence and predictive analytics technologies and tools targeting Cybercrime units of LEAs, Computer Security Incident Response Teams (CSIRTs) of LEAs, Police and Customs Cooperation Centers (PCCCs), Joint Investigation Teams.

Finally, in order to have the full picture of all AI-related issues in the domain of work of Law Enforcement and citizen protection, proposals should:

- tackle the fundamental dual nature of AI tools, techniques and systems, i.e.: resilience against adversarial AI, and prevention and protection against malicious use of AI (including malicious use of the LEA AI tools developed under this project) for criminal activities or terrorism.

The improvement of research results, application and uptake should be taken into consideration. The functionality of existing EU LEAs’ tools and systems needs to be analysed since they need to support the prevention, reaction and detection of cyber threats and security incidents.

Furthermore, the accuracy of AI tools depends on the quantity and on the quality of the training and testing data, including the quality of their structure and labelling, and how well these data represent the problem to be tackled. In the security domain, this issue is further emphasized due to the sensitivity of the data, which complicates the access to real multilingual datasets and the creation of representative datasets. A huge amount of up-to-date high-quality data needed to develop reliable AI tools in support of Law Enforcement, in the areas of cybersecurity and of the fight against crime, including cybercrime and terrorism, asks for the development of training/testing datasets at a European level. This requires a close cooperation of different national Law Enforcement and judiciary systems. Namely, training and testing data sets considered legal and used in one country have to be
shared and accepted in another one, while simultaneously observing fundamental rights and substantial or procedural safeguards. The lack of legislation at the national and international level makes this particularly difficult. The availability of such datasets to the scientific community would ensure future advances in the field.

Thus, in order to address the problem of securing European up-to-date high-quality training and testing data sets in the domain of AI in support of Law Enforcement, proposals under this topic should, from a multidisciplinary point of view, identify, assess and articulate the whole set of actions that should be carried out in a coherent framework:

- A comparative analysis of existing legal provisions throughout Europe that apply in these cases and their impact, including obstacles for research community to access datasets used by LEAs and means of overcoming these obstacles;
- The identification and definition of legislative changes that could be promoted both at the European and Member State level;
- Ethical and operational implications for LEAs;
- The identification of the technical developments that should be carried out to sustain all these aspects;
- Determination of legal and ethical means at the European level that allow for a creation of European up-to-date, representative and large enough high-quality training and testing data sets for AI, in support of Law Enforcement and available to the scientific community working with LEAs.

Proposals should have a clear dissemination plan, ensuring the uptake of project results by LEAs in their daily work.

Taking into account the European dimension of the topic, the role of EU agencies supporting Law Enforcement should be exploited regarding:

- effective channels established between industry and LEAs, closing the gap between public investment and uptake of project results by relevant end-users in their daily work;
- increased exchange of experiences, best practices and lessons learnt throughout Europe leading to EU common approaches for opportunity/risk assessment of AI;
- better understanding and readiness of policy makers on future trends in AI;
- enhanced cooperative operations and synergies between EU LEAs.

Proposals should take into account the existing EU and national projects in this field, as well as build on existing research and articulate a legal, ethical and practical framework to take the best out of the AI based technologies, systems and solutions in the security dimension. Whenever appropriate, the work should complement, build on available resources and contribute to common efforts such as (but not limited to) ASGARD, SIRIUS, EPE, networks of practitioners, AI4EU, or activities carried out in the LEIT programme, namely in Robotics, Big Data, and IoT. As proposals will leverage existing technologies (open source or not), they should show sufficient triage of these technologies to ensure no internalisation of Intellectual Property Rights or security risks as well as demonstrate that such technologies come with adequate license and freedom to operate.

As far as the societal dimension is concerned, proposed solutions of AI applications should respond to the needs of an individual and society as a whole by building and retaining trust. Proposals should analyse the societal implications of AI and its impacts on democracy. Therefore, the values guiding AI and responsible design practices that encode these values into AI systems should also be critically assessed. It should be also shown that the testing of the tools represents well the reality. In addition, AI tools should be unbiased (gender, racial, etc.) and designed in such a way that the transparency and explainability of the corresponding decision processes are ensured, which would, amongst other, reinforce the admissibility of any resulting evidence in court.
Proposals’ consortia should comprehend, besides industrial and research participants, relevant security practitioners, civil society organisations, experts on criminal procedure from a variety of European Member States and Associated Countries as well as LEAs. Proposals should ensure a multidisciplinary approach and have the appropriate balance of IT specialists as well as Social Sciences and Humanities experts.

As indicated in the Introduction of this call, proposals should foresee resources for clustering activities with other projects funded under this call to identify synergies and best practices.

The Commission considers that proposals requesting a contribution from the EU of around EUR 17 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:** Proposals should lead to:

**Short term:**
- Effective contribution to the overall actions of this call;
- Development of a European representative and large enough high-quality multilingual and multimodal training and testing dataset available to the scientific community that is developing AI tools in support of Law Enforcement;
- EU common approach to AI in support of LEAs, centralized efforts as well as solutions on, e.g., the issue of huge amount of data needed for AI.

**Medium term:**
- Improved capabilities for LEAs to conduct investigations and analysis using AI, such as a specific environment/platform where relevant AI tools would be tailored to specific needs of the security sector including the requirements of LEAs;
- Ameliorated protection and robustness of AI based technologies against cyber threats and attacks;
- Raised awareness and understanding of all relevant issues at the European as well as national level, related to the cooperation of the scientific community and Law Enforcement in the domain of cybersecurity and the fight against crime, including cybercrime and terrorism regarding the availability of the representative data needed to develop accurate AI tools;
- Raised awareness of the EU political stakeholders in order to help them to shape a proper legal environment for such activities at EU level and to demonstrate the added value of common practices and standards;
- Increased resilience to adversarial AI.

**Longer term:**
- Improved capabilities for trans-border LEA data exchange and collaboration;
- Modernisation of work of LEAs in Europe and improvement of their cooperation with other modern LEAs worldwide;
- A European, common tactical and human-centric approach to AI tools, techniques and systems for fighting crime and improving cybersecurity in support of Law Enforcement, in full compliance with applicable legislation and ethical considerations;
- Fostering of the possible future establishment of a European AI hub in support of Law Enforcement, taking into account the activities of the AI-on-demand platform;
- Making a significant contribution to the establishment of a strong supply industry in this sector in Europe and thus enhancing the EU’s strategic autonomy in the field of AI applications for Law Enforcement;
- Creation of a unified European legal and ethical environment for the sustainability of the up-to-date, representative and high-quality training and testing datasets needed for AI in support of Law Enforcement; as well as for the availability of these datasets to the scientific community working on these tools;
- Development of EU standards in this domain.
The outcome of the proposal is expected to lead to development from Technology Readiness Levels (TRL) 7-8; please see part G of the General Annexes.

Type of Action: Innovation action

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

**SU-AI03-2020: Human factors, and ethical, societal, legal and organisational aspects of using Artificial Intelligence in support of Law Enforcement**

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**Specific Challenge:** Advantages of AI are numerous. However, the lack of transparency of AI technologies and tools complicates their acceptance by users and citizens. Ethical and secure-by-design algorithms are necessary to build trust in this technology, but a broader engagement of civil society on the values to be embedded in AI and the directions for future development is crucial. This fact is generally correct, and it becomes extremely important in the security domain. Social engagement has to be part of the overall effort to fortify our resilience across institutions, civil society and industry, and at all levels - local, national, European. There is a need to find ways to build a human-centred and socially driven AI, by, amongst other, fostering the engagement of citizens and improving their perception of security. Possible side effects of AI technological solutions in the domain of security need to be considered carefully, both from the point of view of citizens and from the point of view of Law Enforcement: e.g., their concerns regarding a strong dependence on machines, risks involved, how AI will affect their jobs and their organisation, or how AI will affect their decisions. Many open aspects exist that can be a source both of concern and of opportunity and should be addressed in a comprehensive and thorough manner. Finally, the legal dimension should be tackled as well – e.g., how the use of data to train algorithms is dealt with, what is allowed and under which circumstances, what is forbidden and when.

**Scope:** Proposals under this topic should provide an exhaustive analysis of human, social and organisational aspects related to the use of AI tools, including gender related aspects, in support of Law Enforcement, both for cybersecurity and in the fight against crime, including cybercrime, and terrorism. Points of view and concerns of citizens as well as of Law Enforcement should be tackled. Based on this analysis, proposals should suggest approaches that are needed to overcome these concerns and that stimulate the acceptance of AI tools by civil society and by Law Enforcement. Proposals should lead to solutions developed in compliance with European societal values, fundamental rights and applicable legislation, including in the area of privacy, protection of personal data and free movement of persons. The societal dimension should be at the core of the proposed activities. Proposals should be submitted by consortia involving relevant security practitioners, civil society organisations as well as Social Sciences and Humanities experts.

As indicated in the Introduction of this call, proposals should foresee resources for clustering activities with other projects funded under this call to identify synergies and best practices.

The Commission considers that proposals requesting a contribution from the EU of around EUR 1.5 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:** Proposals should lead to:

Short term:
SwafS Opportunities

- Effective contribution to the overall actions of this call.

Medium term:
- Improved and consolidated knowledge among EU Law Enforcement Agency (LEA) officers on the issues addressed in this topic;
- Exchange of experiences among EU LEAs about human, social and organisational aspects of the use of AI in their work;
- Raised awareness of civil society about benefits of AI technologies in the security domain and opportunities it brings.

Longer term:
- European common approach for assessing risks/threats involved by using AI in the security domain, and identifying and deploying relevant security measures that take into account legal and ethical rules of operation, fundamental rights such as the rights to privacy, protection of personal data and free movement of persons;
- Advances towards the implementation of the AI tools and technologies in support of Law Enforcement, in the areas of cybersecurity and fight against crime, including cybercrime, and terrorism, by strengthening the civil society perception of the EU as an area of freedom, justice and security.

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.

Call – Security

SU-DRS01-2018-2019-2020: Human factors, and social, societal, and organisational aspects for disaster-resilient societies

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Specific Challenge: The resilience of societies heavily depends on how their citizens behave individually or collectively, and how governments and civil society organisations design and implement policies for mitigating risks, preparing for, reacting to, overcoming, and learning from disasters. The spread of new technologies and media are inducing dramatic changes in how individuals and communities behave, and they are affecting societies in unpredictable ways. Building the resilience of society and citizens requires a better understanding and implementation of these new technologies, media and tools, and their capacity to raise disaster risk awareness, to improve citizen understanding of risks, to build a culture of risks in society, to enable an effective response from affected populations, to improve functional organisation in most fragile and vulnerable environments, and to increase the resilience of health services, social services, education, and governance, in line with target (d) of the Sendai Framework on critical infrastructure and disruption of basic services.

Scope: Proposals are invited to address related research and innovation issues, in particular:
Recent disasters related either to natural causes (including climate-related hazards) or to terrorist attacks have shown gaps in the level of preparedness of European society for disasters, and therefore highlighted the importance of increasing risk awareness, and hence resilience among people and...
decision-makers in Europe. There is much that can be learned from certain countries with a high level of risk of natural disasters (e.g. Japan with high-levels of risks of earthquakes, volcanic events, and tsunamis) and where risk awareness is high. Research is required with a view to how cultural changes among individuals, business managers, government officials, and communities can create a resilient society in Europe, in line with the Sendai Framework for Disaster Risk Reduction.

Over the past few years several ways to exploit social media and other crowd-sourced data in emergency situations have been studied, and some put in place, but their impacts are not well known. Research is needed to assess such practices for different disaster scenarios (natural hazards, industrial disasters, terrorist threats) involving different actors, including first responders, city authorities and citizens. Research should analyse both the positive and negative roles of social media and crowd-sourced data in crisis situations. For instance in the wake of a terror attack or natural disaster they offer a quick and easy way to relieve friends and family from worry (where networks are not down), and they generate valuable information about the affected area in the first moments after a disaster; they have been used to spread early warnings and important safety information. However, social media may also be used to spread false statements and to overstate threats, so the validation processes of information should also be addressed. Social media itself is reliant upon the functioning of critical infrastructure such as phone networks and may not always be available. Research should also address solutions for communication between first responders and the victims and citizens in the affected area.

Research on risk awareness should encompass the whole of the disaster management cycle, from prevention (e.g. through education) and preparedness (knowing how to react), emergency management (collaboration and communication before and during an event), response (empowering citizens to act efficiently by themselves according to more effective practices and following established guidelines), and recovery (knowledge to build back better). Researchers should take into account tangible and intangible cultural heritage, traditional know-how, land use, construction technologies, and other local knowledge which is a valuable source of information for the local communities and can help prevent the creation of new risks, to reduce existing risks, to prepare for and to respond to disasters and to build back better.

Sub-issues to be addressed are diversity in risk perception (as a result of e.g. geography (within Europe), attitudes, institutional and social trust, gender and socio-economic contexts), in vulnerabilities and in understanding responses to crises in order to propose new approaches and strategies for community awareness, for leadership, and for crisis readiness and management with a particular emphasis on the use of new technologies.

For achieving disaster-resilient societies that cope with disasters and build back better, the research community needs to transfer research outputs in an appropriate manner to meet citizen expectations given the current levels of risk acceptance, risk awareness, and involvement of civil society organisations in a mediating role.

Civil society organisations, first responders, (national, regional, local, and city) authorities are invited to propose strategies, processes, and methods to enable citizens better to access research results related to disaster resilience, and to prepare the ground for exercises involving citizens. These strategies, processes, and methods should be tested with citizens and communities representative of European diversity and for different types of disaster, in particular with regards to citizens' individual capacities and their involvement in checking and validating proposed tools, technologies and processes for disaster management. Studies will assess the value of raising awareness about relevant research among citizens and communities.

Proposals should be submitted by consortia involving relevant security practitioners and civil society organisations. Research should contribute to the understanding of society's awareness to risks in Europe in order to provide recommendations for the development of a culture of improved preparedness, adaptability, and resilience to risks, including the use of social media and crowd-sourced data, and the involvement of the citizens in the investigations and possible validation of tools and methods.
In line with the objectives of the Union’s strategy for international cooperation in research and innovation (COM(2012)497), international cooperation according to the current rules of participation is encouraged (but not mandatory).

The Commission considers that proposals requesting a contribution from the EU of about EUR 5 million would allow this specific challenge to be addressed appropriately through multidisciplinary projects confronting different schools of thoughts. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

**Expected Impact:** As a result of this action, Member States and Regional authorities as well as City and Metropolitan authorities should benefit from recommendations and tools aimed at improving the adaptability and preparedness of societies to different disaster risks, including:

- **Comparative analysis of the European diversity in terms of risk-perception amongst citizens, and of vulnerabilities;**
- Comparative analysis of different approaches to adapt to, and be prepared for risks in different countries (both within and outside the European Union), and among communities in precarious socio-economic conditions;
- Advances through the cross-fertilisation of concepts resulting from the collision of different ways of thinking and of different approaches developed by various partners in the proposals;
- Identification of existing tools and guidelines for an improved prevention (including risk understanding and communication), preparedness (including training involving citizens), alert systems and their recognition by citizens, responses using citizen's competencies and local knowledge, and recovery;
- Improved information exchanges among different actors involved, including first responders, local authorities, schools, and citizen representatives;
- Field-validation of different approaches related to different disaster risks involving the above actors, in representative urban and non-urban environments, including in areas where precarious socio-economic conditions prevail;
- **Intensive sharing, among communities, of good practices and of learnings resulting from citizen-scientist interaction;**
- A consolidated, common European understanding of disaster resilience.

**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.*

**SU-DRS02-2018-2019-2020: Technologies for first responders**

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**Specific Challenge:** Resilience is critical to allow authorities to take proper measures in response to severe disasters, both natural (including climate-related extreme events) and man-made. Innovation for disaster-resilient societies may draw from novel technologies, provided that they are affordable, accepted by the citizens, and customized and implemented for the (cross-sectoral) needs of first responders.
**Scope:** Proposals are invited to propose novel solutions improving the protection of first responders against multiple and unexpected dangers, or enhancing their capacities by addressing related research and innovation issues, in particular:

- **Sub-topic 3: [2020]** Methods and guidelines for pre-hospital life support and triage

  Development of innovative tools, methodologies and European pre-hospital guidelines for first responders of medical services, fire services and police and hospital trauma teams in order to ensure faster and more effective evaluation and control of numerous seriously injured casualties in disaster and/or emergency situations. This should take account of lessons learned from military mass-casualty techniques such as damage-control surgery. The aim is to ensure more effective pre-hospital triage of victims with appropriate digital traceability of actions and data transfer from the event to the hospital(s), including across administrative and political boundaries. If appropriate, proposals should demonstrate how they will build on relevant previous and on-going FP7 and/or H2020 projects.

- **Sub-topic: [2018-2019-2020] Open**

  Other technologies for use by first responders may be subject of proposals provided that they involve a large number of first responders’ organisations (see eligibility and admissibility conditions.) For instance, but not exclusively: communicating and smart wearables for first responders and K9 units including light-weight energy sources; situational awareness and risk mitigation systems for first responders using UAV and robots, connected and swarms of drones; systems based on the Internet of Things; solutions based on augmented or virtual reality; systems communication solutions between first responders and victims; risk anticipation and early warning technologies; mitigation, physical response or counteracting technologies; etc.

  Any novel technology or methodology under this topic should be tested and validated, not just in laboratories but also in training installations and through in-situ experimental deployment. They therefore need to be quick to deploy, bases on resilient and robust communication infrastructure. First responders, including through interdisciplinary teams (e.g. involving medical emergency services, public health authorities, law enforcement team, civil protection professionals, etc.) need to be involved in these activities. Proposals should address the participation of first responders in a systematic manner, and propose new methods on how to involve them and to organise their interaction with researchers when developing, testing, and validating technologies and methods. **Solutions are to be developed in compliance with European societal values, fundamental rights and applicable legislation, including in the area of privacy, personal data protection and free movement of persons. Societal aspects (e.g. perception of security, possible effects of technological solutions on societal resilience, gender diversity) have to be taken into account in a comprehensive and thorough manner.**

In line with the objectives of the Union’s strategy for international cooperation in research and innovation (COM(2012)497), international cooperation according to the current rules of participation is encouraged (but not mandatory), in particular with Japanese or Korean research centres. Co-funding opportunities from the Japan Science and Technology Agency exist for Japanese partners. Co-funding opportunities from the Korean MSIP/NRF exist for Korean partners.

The centre of gravity for technology development with actions funded under sub-topics 1,2 and open is expected to be up to TRL 4 to 6, whereas under sub-topic 3 it is expected to be up to TRL 6 to 7 – see General Annex G of the Horizon 2020 Work Programme.
The Commission considers that proposals requesting a contribution from the EU of about 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:** As a result of this action, first responders should benefit from:

- Novel tools, technologies, guidelines and methods aimed at facilitating their operations
- New knowledge about field-validation of different tools, technologies and approaches involving first responders in (real-life) scenarios

**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.*

**SU-FCT01-2018-2019-2020:** Human factors, and social, societal, and organisational aspects to solve issues in fighting against crime and terrorism

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**Specific Challenge:** The free and democratic EU society, based on the rule of law, mobility across national borders, globalised communication and finance infrastructure, provides many opportunities to its people. However, the benefits come along with risks related to crime and terrorism, a significant number of which have cross-border impacts within the EU. Security is a key factor to ensure a high quality of life and to protect our infrastructure through preventing and tackling common threats. The EU must play its part to help prevent, investigate and/or mitigate the impact of criminal acts, whilst protecting fundamental rights. The consistent efforts made by EU Member States and the EU to that effect are not enough, especially when criminal groups and their activities extend far beyond national borders.

**Scope:** The Lisbon Treaty enables the EU to act to develop itself as an area of freedom, security and justice. The EU Security Union is now in the building, and requires an EU-wide approach to security that integrates prevention, investigation and mitigation capabilities in the area of the fight against crime.

The globalisation of communications and finance infrastructure allows crime to develop and take new forms. Trafficking in human beings for all forms of exploitation purposes is a serious and organised crime often with cross-border dimension, violating fundamental rights of the individuals and creating a security challenge. Prevention of child sexual abuse and exploitation is another area where research is acutely needed. The use of the internet as a platform for child sex offenders to communicate, store and share child sexual exploitation material and to hunt for new victims continues to be one of the internet’s most abhorrent aspects. Cybercriminality, as a whole, is not satisfactorily understood nor properly addressed; the constantly expanding attack surface combined with the ever increasing number of attack vectors requires a more structured approach. Radicalisation is yet another challenge of our society that requires a multi-disciplinary approach, with policy recommendations and practical solutions to be implemented by a variety of policy-makers and practitioners.

Proposed approaches need to rely on existing knowledge and to exclude approaches that have previously failed. The societal dimension of fight against crime and terrorism should be at the core of the proposed activities. *Proposals should be submitted by consortia involving relevant security practitioners and civil society organisations*, each under only one of the following sub-topics:
• **Sub-topic 1: [2018, 2020] New methods to prevent, investigate and mitigate trafficking of human beings and child sexual exploitation – and on the protection of victims**

Globalisation and technological developments facilitate trafficking in human beings and child sexual exploitation. A variety of preventive measures, as well as measures to ensure adequate victim protection and assistance are needed, that build upon advances in social sciences and humanities. Proposals in this subtopic should address both phenomena in a balanced way. They should ensure that the research focuses on prevention, investigation and/or assistance related to all victims of trafficking and not only addressing child trafficking. In the same way, the proposals should cover any area concerning prevention, investigation and/or assistance to victims of child sexual exploitation, not only the assistance to victims of child sexual exploitation resulting from trafficking.

With respect to the trafficking of human beings, research should bear on:

- preventing the phenomenon and to reduce the demand for all forms of exploitation in the trafficking chain and its legal and illegal sectors. The analysis of possible involvement of organized crime groups implicated in trafficking of human beings in other crimes as well (e.g., financial crimes) is recommended;
- new approaches to investigate cases involving the trafficking of human beings;
- new approaches to mitigate the impact on victims in the short and long term.

Regarding child sexual exploitation:

- how to address new threats, such as live-streaming of child abuse and coercion and extortion of victims that have escalated in the last years;
- how to provide law enforcement with effective means to detect, investigate and bring down the many peer-to-peer networks and the growing number of forums on the darknet that facilitate the exchange of child sexual exploitation material and support offenders;
- how to help victims of abuse during criminal investigations and court procedures;
- how to help the victims in the long term, to help them deal with the effects;
- how to reduce risks of (re-)offending by better understanding the behaviour of abusers and potential abusers.

• **Sub-topic 3: [2020] Developing evidence-based approaches to evaluate and to further develop initiatives to prevent and counter violent radicalisation**

The following issues are of particular interest: factors and pathways into radicalisation; factors influencing resilience to radicalisation, with a focus on groups requiring particular attention (such as children); the nexus between violent extremism and other forms of crime; violent extremism online (e.g., social media) and terrorist propaganda; evaluation and impact of counter-narratives and alternative narratives; how to address returnees, with a focus on children and women; dealing with extremists after their release from prison (and involving penitentiary services and legal authorities); gender and socio-economic aspects of radicalisation; challenges related to the lone actor phenomenon and evaluation of national and local prevent strategies. The objective of this sub-topic is not to support projects which cover all those issues. Proposals should therefore address one or more of the issues mentioned above. They should take into account the importance of a multi-disciplinary, multi-agency and multi-stakeholder approach.

Proposals should refer to evidence-based research that compares and distils various approaches to the issue or issues that they are addressing, providing outcomes which are of direct use for policy makers and practitioners. Proposals should furthermore provide quantitative and/or qualitative indicators to allow for the evaluation of prevent, counter and de-radicalisation initiatives. The proposals could also analyse and evaluate different research methodologies in this field. Proposals should build on the expertise of different disciplines and stakeholders, including practitioners, in order to reflect the horizontal challenge of radicalisation.
The aim is not necessarily to develop new responses, but to focus on comparative analyses and evaluations of existing responses in order to identify transferrable and effective approaches based on what has been done so far, and/or to elaborate performance indicators and/or evaluation methods. In line with the EU’s strategy for international cooperation in research and innovation (COM(2012)492), international cooperation is encouraged. If appropriate, the proposals should demonstrate how they will effectively build on relevant previous and on-going EU funded (including but not limited to the Internal Security Fund - Police) radicalisation projects.

**Expected Impact:** Medium term:
- improved and consolidated knowledge among EU Law Enforcement Agencies officers on the issues addressed in this topic;
- exchange of experiences among EU Law Enforcement Agencies about human, social and societal aspects of security problems and their remedies;
- policy-making toolkits for security policy-makers, to support the establishment of a European Security Model;
- toolkits for EU Law Enforcement Agencies and/or civil society organisations, validated against practitioners’ needs and requirements to facilitate their daily operations.

Long term:
- European common approaches for assessing risks/threats, and identifying and deploying relevant security measures, which take into account legal and ethical rules of operation, cost-benefit considerations, as well as fundamental rights such as the rights to privacy, to protection of personal data and the free movement of persons;
- support towards the implementation of the European Security Union by strengthening the perception by citizens of the EU as an area of freedom, justice and security;
- advances through the cross-fertilisation of concepts resulting from the collision of different ways of thinking and of different approaches developed by various partners in the proposals.

**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.*

**SU-FCT02-2018-2019-2020: Technologies to enhance the fight against crime and terrorism**

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**Specific Challenge:** Organized crime and terrorist organisations are often at the forefront of technological innovation in planning, executing and concealing their criminal activities and the revenues stemming from them. Law Enforcement Agencies (LEAs) are often lagging behind when tackling criminal activities supported by advanced technologies.

**Scope:** There is a growing need to focus on technology opportunities provided by new and emerging technologies. To this end, it is necessary to identify new knowledge and targeted technologies for fighting old, new and evolving forms of criminal and terrorist behaviour supported by advanced technologies. Challenges are numerous. In conventional investigations, rapid and near real-time forensics is often crucial for preventing subsequent attacks or crimes. A consequence of the increasing digitisation of society and ever increasing adoption levels is that virtually any type of crime has a digital forensics component, which is a challenge in itself. Money-flow tracking represents yet
another challenge. The issues of location and jurisdiction need to be addressed, taking into account highly probable cross-border nature of such crimes.

Proposals should be submitted under only one of the following sub-topics:

- **Sub-topic 1: [2019] Trace qualification**

  Forensic analysis of trace material can be extremely helpful in the initial phase of investigation, if the answers are rapid (near real-time), at an acceptable cost and compliant with criminal justice. Novel robotized or automated tools for forensic analysis should be developed. There is a need for a better knowledge and interpretation of: trace composition, time when they were left, cause of their origin (crime-related or inoffensive), etc.

  Proposers are encouraged to address how they contribute to the European Forensic Science Area.

- **Sub-topic 2: [2018-2019] Digital forensics in the context of criminal investigations**

  New forensic tools, techniques and methodologies are needed, based on common practices, standards, protocols and/or interoperability requirements that allow for rapid retrieval, storage, analysis and validation of digital evidence (including the one stored in the cloud) that upholds in court, and enables investigations to identify perpetrators as well as victims, in particular in cases of child sexual abuses. They should focus on data gathering, data exploitation, and speedy exchange of information. All types of crime, terrorist activities and propaganda, and malicious acts by foreign-state perpetrators are concerned. Research in this domain should take into account new and emerging trends (for instance, abuse of encryption for criminal or terrorist purposes), while fully respecting fundamental rights such as the right to privacy and the right to protection of personal data.

  In 2019, proposals should focus on data gathering, classification and exploitation, as well as speedy exchange of information in the context of child sexual abuses investigations, taking into account main and emerging trends (for instance, intensive use of Peer to Peer network, anonymous activity on the Dark Web and abuse of encryption).

- **Sub-topic 3: [2020] Money flows tracking**

  Organized crime increasingly adopts technology (for example, pseudo-legal sales, shadow economy, internet/Darknet as well as cryptocurrencies) as a facilitator for preparation, organisation and execution of various physical/traditional criminal activities (e.g., child sexual abuse, trafficking of organs or human embryos, trafficking of human beings, trafficking of firearms, drug trafficking, money laundering and terrorism) and/or as a tool for online criminal activities (e.g., ransomware, domain-name piracy, phishing). Furthermore, there is a need for governing and detecting cross-border money flows with the potential to support terrorism, for reinforcing effective and legitimate public-private cooperation for the sharing of financial data, and for strengthening the effectiveness of current methods of countering terrorism financing and of modelling abnormal transactions in the fight against terrorism.

  Research should address the following issues: approaches to identify new developments (new markets and networks; new modi operandi); tools for tracing money flows as well as those engaged in criminal activities online **whilst ensuring privacy and protection of personal data**; Darknet marketplace analysis and mobility; tools for locating and mapping hidden service directories; tools for forensic analysis of digital media in order to identify digital currency datasets; data provenance models (providing evidence that is admissible in court), including the relationship between algorithmic proof artefacts and legal evidence.

- **Sub-topic 4: [2020] Development and deployment of technologies, tools and relevant infrastructure to identify speedily terrorist content online, and prevent its re-upload**
To address the threat of terrorist content online, the Commission has adopted a proposal for a Regulation on 12 September 2018. Under the proposal a number of measures would be required to be taken by Member States (in particular law enforcement authorities)/Europol and hosting service providers. Hosting service providers from around the world (covering social media, cloud services, file sharing, etc.) offering their services to EU citizens would be required to put in place a certain number of measures, ranging from speedy reactive ones e.g. one hour deadline to remove or disable terrorist contents following a removal order from a Member State authority (considering that terrorist content is most harmful in the first hours of its appearance online) to proactive measures, including automated detection, in order effectively and swiftly to remove or to disable terrorist content and to stop it from reappearing and being disseminated once it has been removed.

Under the proposal, these measures would need to be implemented not only by large companies, but also by micro enterprises and SMEs, irrespective of size or turnover, albeit remaining proportionate. Putting in place such proactive/automated means is likely to create a burden on resources, hence mitigating measures for the benefit of smaller companies should be envisaged. Research should therefore be leveraged to support the development and deployment of technologies, tools and relevant infrastructure to identify speedily terrorist content online, and to prevent its re-upload. The media content analysis could play a relevant role in the development of tools for the active detection of harmful online behaviour (e.g. with natural language processing or image/video content analysis). The beneficiaries of such projects should include SMEs so as to ensure that the technology developed would be of direct relevance to their platforms. A further global take-up and dissemination of these technologies, tools and infrastructure where relevant should also be encouraged.


Proposals addressing other issues relevant to this challenge (for instance: technologies to improve LEAs capabilities (including augmented reality); autonomous systems to improve the fight against crime and terrorism; technologies to support better protection of public figures; tracking and monitoring technologies, including automated prevention of uploading terrorism-related content; capabilities to detect the widest possible range of threats and concealments (including complex concealed weapons)) and supported by a large number of practitioners are invited to apply under this sub-topic (see eligibility and admissibility conditions).

In all sub-topics and in order to facilitate the EU-wide take-up of new technologies, proposers are encouraged to include the design of innovative curricula for LEAs training and (joint) exercises, and of information packages for the wider public and civil society organisations.

Proposals should lead to solutions developed in compliance with European societal values, fundamental rights and applicable legislation including in the area of privacy and protection of personal data. Societal aspects (e.g. perception of security, possible side effects of technological solutions, societal resilience) have to be addressed in a comprehensive and thorough manner.

The centre of gravity for technology development with actions funded under this topic is expected to be up to TRL 4 to 6 – see General Annex G of the Horizon 2020 Work Programme.

The Commission considers that proposals requesting a contribution from the EU of about 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: Medium term:
- novel, user-friendly technologies, tools and/or systems, addressing traditional or emerging forms of crime and terrorism at acceptable costs;
- improved investigation capabilities, especially regarding quality and speed;
- increased efficiency and effectiveness of the information sharing among EU LEAs.
Long term:
- prevention/reduction of criminal and terrorist threats;
- harmonisation of information formats at international level, improved cross-border acceptance and exchange of court-proof evidence, standardised evidence collection and harmonised procedures in the investigation of trans-border crimes in full compliance with applicable legislation on protection of personal data.

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.

SU-FCT03-2018-2019-2020: Information and data stream management to fight against (cyber)crime and terrorism

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Specific Challenge: Large amounts of data and information from a variety of origins have become available to practitioners involved in fighting crime and terrorism. Full advantage is not currently taken of the most advanced techniques for Big Data analysis, and artificial intelligence.

Scope: The amount of data generated and gathered in the frame of (cyber)crime investigations increases exponentially, thereby creating a considerable challenge for law enforcement. The effectiveness of law enforcement action depends on capabilities to improve the quality of data, and to convert voluminous and heterogeneous data sets (images, videos, geospatial intelligence, communication data, traffic data, financial transactions related date, etc.) into actionable intelligence. These capabilities could be significantly enhanced by the use of domain-specific tools, i.e. Big Data analysis applications designed for the needs of crime investigators (pre-processing, processing and analysis, visualisation, etc.). Furthermore, predictive analytics would greatly benefit from open source intelligence gathering, social network and darknet data analysis, and allow for resource-efficient, effective and proactive law enforcement.

Examples of trends in cybercrime are numerous. The Internet of Things can potentially connect practically everything, thus also potentially making everything more vulnerable. Wearable devices make us traceable, 3D printers can produce weapons, autonomous cars provide opportunities for kidnappers, teleworking opens doors for cyber-espionage etc. Cybercriminals follow the technological development and benefit from it, while measures for countering cybercrime are often one step behind. Law Enforcement Agencies would benefit from new means of preventing and countering new kinds of crime, building on the comprehensive trend analysis of emerging cybercrime activities based on past of (cyber)criminal activities, on technological developments, and on trends in the society.

Criminal and terrorist acts are usually subsequent to patterns of abnormal behaviour. Behavioural/anomaly detection systems (using a large variety of sensors) and methodologies require the analysis and processing of enormous quantities of data, together with improved imaging techniques to allow for the identification of suspicious events or of criminals. Such systems should operate in near real-time and at similar distances as a surveillance camera. They should also comply with privacy requirements and the respect of fundamental rights such as the right to privacy and the right to protection of personal data.
Proposals are invited from consortia involving relevant security practitioners, civil society organisations, and the appropriate balance of IT specialists, psychologists, sociologists, linguists, etc. exploiting Big Data and predictive analytics that both (a) characterise trends in cybercrime and in cybercriminal organizations (based on a profound analysis of current and emerging cybercriminal organizational types and structures), and (b) enhance citizens' security against terrorist attacks in places considered as soft targets, including crowded areas (stations, shopping malls, entertainment venues, etc.).

In 2020, proposals should address exclusively point b), with a focus on private operators. Although public authorities are primarily responsible for security, public-private cooperation is key in protecting public spaces. As an example, the first persons on the scene of a terrorist attack are often not police officers, but private security staff from local shops or transport operators. Moreover, public spaces are often owned and operated by private entities.

Proposals should lead to solutions developed in compliance with European societal values, fundamental rights and applicable legislation including in the area of privacy and protection of personal data. Societal aspects (e.g. perception of security, possible side effects of technological solutions, societal resilience) have to be addressed in a comprehensive and thorough manner.

The centre of gravity for technology development with actions funded under this topic is expected to be up to TRL 5 to 7 – see General Annex G of the Horizon 2020 Work Programme. The Commission considers that proposals requesting a contribution from the EU of about 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: Medium term:
- improved support for the work of Law Enforcement Agencies in managing Big Data, i.e. in extracting, combining, analysing and visualising large amounts of structured and unstructured data in the context of criminal investigations;
- increased awareness regarding the state of the art and trends in cybercriminal activities (short-, mid- and long-term);
- in-depth knowledge of means of preventing and countering emerging and future cybercriminal activities;
- improved capabilities to combine and analyse in near-real-time large volumes of heterogeneous data to anticipate criminal events;
- shorter delays between the emergence of new cybercrime activities and the deployment of countermeasures.

Long term:
- a European, common strategic approach for preventing and countering an emerging cybercrime activity in its early stage of development;
- a European, common strategic approach for processing and combining huge amounts of data in the context of crowd protection in full compliance with applicable legislation on protection of personal data.

Type of Action: Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.
Specific Challenge: Border and external security may depend on a variety of human factors, and social and societal issues including gender. The adoption of appropriate organisational measures and the deeper understanding of how novel technologies and social media impact border control are required. One main challenge is to manage the flow of travellers and goods arriving at our external borders, while at the same time tackling irregular migration and enhancing our internal security. Any novel technology or organisational measure will need to be accepted by the European citizens. For the purpose of this topic, 'migration' does not refer to persons enjoying the right of free movement under Article 21 TFUE and secondary legislation (i.e. Union citizens and their family members, independently of their nationality).

Scope: Proposals (which should take into account already existing tools) are invited to address related research and innovation issues, each under only one of the following sub-topics:

- Sub-topic 1: [2018] Detecting security threats possibly resulting from certain perceptions abroad, that deviate from the reality of the EU

Research should investigate how to better detect and understand how the EU is perceived in countries abroad by analysing e.g. social media data, how such perception could possibly lead to threats and security issues on its citizens and territories, and how such perceptions can be avoided or even actively and effectively counteracted through various measures. In line with the objectives of the Union’s strategy for international cooperation in research and innovation (COM(2012)497), international cooperation according to the current rules of participation is encouraged.

- Sub-topic 2: [2019] Modelling, predicting, and dealing with migration flows to avoid tensions and violence

Better modelling and predicting migration flows, based on a sound analysis and taking into account gender aspects, is required for high-level strategic decision-making, to plan and implement operational activities. For the management of the migratory flow, including relocations within the EU, it is necessary to map public sentiment, including perceptions of migration, by analysing data available from many different governmental or public sources, and by developing socio-economic indicators of integration strategies. Proposals should be solution-oriented and propose convincingly how to better deal with such flows and to reduce risks of tensions and violence among migrants and European citizens.

Participation of Border or Coast Guards Authorities or those working with at-risk groups, for example first responders, municipalities, social workers, educators, civil society actors etc. is welcome.

- Sub-topic 3: [2020] Developing indicators of threats at the EU external borders on the basis of sound risk and vulnerability assessment methodologies

EU border guards have to deal with diverse serious challenges at external borders, e.g. management of flows of people, smuggling and the use of counterfeit documents. Arrivals of thousands of people through one border area will quickly trigger a reaction, whereas the detections of a few cases of document fraud on a daily basis will be considered as part of the routine work and is unlikely to trigger a strong reaction. Research that assesses the impacts on the EU’s internal security of different
threats and that proposes a model to compare those threats would assist in improving the situational awareness of decision-makers across the EU.

This research on external threats would also further enrich the vulnerability assessment tasks as defined in the European Border and Coast Guard Regulation.

Proposals should aim at improving the effectiveness of border control, including air, land and maritime borders, by developing dynamic composite indicators of threats, so that various threats occurring simultaneously at the border can be compared and priority for mitigation can be proposed. This should be based not only on the absolute number of detections at the border, but also on their synergies and inter-relationships, as well as on the impact that such detections may have on the internal security of the EU.

The fitness for purpose of the concepts proposed should be duly demonstrated in the relevant environment.


More information on vulnerability assessment activities is available at: https://frontex.europa.eu/intelligence/vulnerability-assessment/.

- Sub-topic: [2018-2019] Open

Proposals addressing other issues relevant to this challenge, based on a sound rationale, and supported by a large number of relevant practitioners are invited to apply under this sub-topic (see eligibility and admissibility conditions.)

Proposals should lead to solutions developed, tested and validated in compliance with European societal values, fundamental rights (including gender equality) and applicable legislation including in the area of free movement of persons, privacy and protection of personal data. Societal aspects (e.g. perception of security, possible side effects of technological solutions, societal resilience) have to be analysed in a comprehensive and thorough manner with a view to facilitating future acceptance of such solutions.

Proposals should pursue truly innovative approaches. They should be submitted by consortia also involving civil society organisations. Synergies are encouraged with the work for the knowledge centre on migration and demography set up by the Commission https://ec.europa.eu/jrc/en/migration-and-demography.

The Commission considers that proposals requesting a contribution from the EU of about 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:
- Knowledge and evidence-based support to policy developments, with fitness for purpose validated by policy-makers and by practitioners and in cooperation with civil-society organisations in the Member States, the Associated Countries, and abroad where appropriate.
- Methods to better manage the complexity (from reducing the incentives for irregular migration, to the analysis and sharing of best practices, and towards an effective application of common rules…) of the issues, with fitness for purpose validated by practitioners and civil-society organisations.
- Advances through the cross-fertilisation of concepts resulting from the collision of different ways of thinking and of different approaches developed by various partners in the proposals.
- [2020] Contribution to the development of EU joint capabilities for border management and support to the implementation of policy priorities.
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.

SU-BES02-2018-2019-2020: Technologies to enhance border and external security

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Specific Challenge: Innovation for border and external security may draw, in particular, from novel technologies, provided that they are affordable, accepted by citizens and customized and implemented for the needs of security practitioners.

Scope: Proposals are invited to address related research and innovation issues, in particular:

[...]

- Sub-topic 5: [2020] Disruptive technologies for non-intrusive identification of hidden goods

Detecting and identifying illegal goods hidden in containers, train cars and truck structures at EU external borders (e.g. ports, wharfs, rail yards, ...) is a need shared by border guard, customs and law enforcement authorities. Illegal goods, including drugs, weapons, explosives, radiological and nuclear material, are trafficked into Europe by criminal organisations using a range of methods and tools, which are very diverse (e.g. to minimize the risk of detection during transportation, some drugs may be transformed into a liquid and turned back into a solid at destination) and adaptable to specific border conditions. These may also include taking advantage of new technology to facilitate access to containers.

Research should focus on the use of improved sensing technologies. The availability of a system of sensors producing a highly detailed, user friendly, 3-dimensional insight into the internal structure of a container (or truck), and the type of cargo carried, in a limited amount of time, would in particular be a valuable disruptive innovation for the customs and border inspection community. The system of sensors should be suitable for deployment and operation in a flexible and relocatable way, including mechanisms to improve field usability. The system should also allow for a swift gathering and exchange of information with other systems in order to facilitate a faster and more accurate localisation and identification of illicit cargo, without the need to open containers (this being a clear improvement when compared to current capabilities).

In line with the above, the newly developed solutions should allow for interoperability with state of the art and with foreseeable future border and customs information systems in order to optimise the overall container screening process using a risk-based approach.

Proposals should conduct testing and validation in the relevant environment.


Proposals addressing other issues relevant to this challenge, based on a sound rationale and supported by a large number of relevant practitioners are invited to apply under this sub-topic (see eligibility and admissibility conditions.)

Proposals should lead to solutions developed, tested, and validated in compliance with European societal values, fundamental rights and applicable legislation, including in the area of free movement of persons, privacy and protection of personal data. Societal aspects (e.g. perception of security,
possible side effects of technological solutions, societal resilience) have to be addressed in a comprehensive and thorough manner.

The centre of gravity for technology development with actions funded under this topic is expected to be up to TRL 5 to 6 – see General Annex G of the Horizon 2020 Work Programme. The Commission considers that proposals requesting a contribution from the EU of about 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:** Short term:
- Clear, realistic benchmarks against which to assess progress, so as to possibly stop the project if at mid-term review progress is not deemed sufficient.
- Plan to provide confidence in the take up of project results after the completion of the project.

Medium term:
- Evidence based knowledge, and developments performing beyond the current state of the art and leading quickly to innovation.
- Technical and operational guidelines, recommendations and best practices set in the EUROSUR handbook and in the future handbook for coast guards (as per Article 53 of the European Border and Coast Guard regulation.)

Long term:
- Implementation of solutions resulting from the legislative initiative in the "Smart Borders" package;
- Implementation of actions of civilian nature identified in the EU Maritime Security Strategy action plan;
- Implementation of the actions identified by the EU Strategy and Action Plan for customs risk management.

**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.*

**SU-BES03-2018-2019-2020: Demonstration of applied solutions to enhance border and external security**

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**Specific Challenge:** Solutions at high Technological Readiness Levels (TRL; please see General Annex G) to enhance border and external security do exist, but if they are not to remain unused they need to be demonstrated in the context of actual operations or exercises for validation by practitioners.

**Scope:** Consortia are invited to propose demonstration of high (6-8) Technology Readiness Levels (TRL) systems applied in the context of border and external security. (TRL: please see General Annex G.)

Proposals should be submitted under only one of the following sub-topics:

- **Sub-topic 1:** [2018] Remotely piloted aircrafts and underwater autonomous platforms to be used from on-board offshore patrol vessels
Remotely piloted autonomous platforms of all kinds should demonstrate innovative capacities for land border and coast surveillance. Underwater autonomous platforms are also of interest for choke points surveillance (i.e. a port entrance.)

Research on artificial intelligence is likely to facilitate the transition from innovation to operation. Such platforms play an important role in facilitating long range and persistent surveillance in wide maritime areas, complementing operation from offshore patrol vessels. Improving the cost effectiveness, reliability and availability of such platforms, either by increasing the performance of existing technologies or by developing innovative concepts of operation, would notably contribute to better situational awareness at the tactical level beyond coastal waters (up to 200 nautical miles), while reducing risks during search and rescue missions, including launch and recovery phases, even in adverse sea and weather conditions. Proposals should aim at improved cost effectiveness, in particular through the remote operation of sensors mounted on aerial platforms (including optionally and remotely piloted) and by improving the on-board processing of payload data, while minimizing the data transmission to the ground segment.

- Sub-topic 2: [2019] New concepts for decision support and information systems

Information systems to support border and external security may combine a broad variety of data from very different sources, including personal data. Innovative solutions are needed to ensure the interoperability of surveillance systems, and the availability of information for maritime border surveillance coming from the area of operations in standardized formats, when and where it is needed, thus at enhancing situation awareness at strategic level (in National Coordination Centres), but also at tactical level (with assets deployed under the frame of surveillance operations). This would allow faster reaction to incidents in the maritime domain, and a reduction in the death toll at sea. Proposals should aim at optimize the exploitation of data for their specific use in surveillance is currently embryonic, and needs to take better account of the specific characteristics of the domain, with a view to provide the needed information reducing redundancies.

- Sub-topic 3: [2020] Improved systems for the vessel tracking, behaviour analysis and automatic anomaly detection

Current maritime reporting systems (including ship reporting systems and container reporting systems) produce huge quantities of data which cannot be directly exploited by the human operators in the various maritime control centres. This is expected to be even more so in the near future, as the amount of data available shall increase with the introduction of VHF Data Exchange System (VDES). At the same time, non-homogenous sources of vessel information are accessible, these offer access to either open or proprietary data that could be used to perform risk analysis on each individual vessel navigating in, or on its way to, European waters.

Traditional reporting systems are not enough by themselves to allow for a reliable detection of anomalies. Therefore, research under this topic should focus on innovative solutions bringing together these three elements: reporting and surveillance systems data (e.g. containing information on a vessel journey), relevant information databases (containing vessels’ and/or containers’ historical information) and real or near real time data resulting from other reporting or surveillance sources. The aim is to provide more precise, more robust and earlier anomaly detection. The combination of these sources of information should produce a risk scoring figure to be assigned to specific vessels which could, in turn, facilitate the discovery of possible illegal activities carried out by those vessels. The solutions should be based on implementation agnostic, innovative algorithms for artificial intelligence and machine learning, applied to existing ship reporting systems and maritime databases and information sources. These algorithms should exploit, when appropriate and without precluding other methods, the capacity of Artificial Intelligence-enabled solutions. The solutions should automatically allocate risk level to vessels according to risk measured on the basis of anomalies detected on the reporting systems and on a vessel’s previous history. Solutions should also take into
account special requirements found when working with very large amounts of data, coming from a wide range of heterogeneous sources.

The fitness for purpose of the proposed solutions should be systematically tested and validated (i.e. planned, implemented, reported and assessed) in a real operational environment at the EU external borders under the control of potential end-users, delivering quantifiable, verifiable and comparable measures of effectiveness and performance. Proposals should recommend concrete approaches for their market uptake, taking into consideration the characteristics of the EU security market, business cases favourable for joint cross-border procurement and possible synergies with EU funding instruments.

Where appropriate, the use of CISE data and services model is encouraged. The research undertaken in previous projects (I2C, TRITON, MARISA..) should not be duplicated.

- **Sub-topic: [2018-2019-2020] Open**

Proposals addressing other issues relevant to this challenge, based on a sound rationale and with the active involvement of a large number of relevant practitioners are invited to apply under this sub-topic (see eligibility and admissibility conditions.)

Proposals submitted under this topic should be coordinated by a competent authority under civilian authority and command, nationally identified as specialised border or coast guard, or border police force.

They should clearly demonstrate how they complement and do not overlap with actions undertaken in the Preparatory Action on Defence Research under topic **PADR-US-01-2017: Technological demonstrator for enhanced situational awareness in a naval environment**.

Certain operational costs are excluded from eligible costs (see eligibility and admissibility conditions.) Proposals should lead to solutions developed in compliance with European societal values, fundamental rights and applicable legislation, including in the area of free movement of persons, privacy and protection of personal data. The Commission considers that proposals requesting a contribution from the EU of about 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: Medium term:**
- Innovative solutions validated and qualified in the real, operational environment of civilian missions, defined in detail according to specifications set by the practitioners (authorities in charge of border surveillance and coast guard functions) and tailored to effectively meet their requirements within civilian missions.
- Plans for the quick take up of qualified systems at EU level.
- Plans for transnational procurement strategies.

**Long term:**
- Improved cost-effectiveness and efficiency of systems for the prevention of cross border crime and for border surveillance for civilian purposes.
- European standards for interoperable systems.
- Substantial and tangible improvement of (maritime) situational awareness and reaction capability, as appropriate in surveillance for civilian purposes, fight against crime, and search and rescue missions by the National and European Border and Coast Guards.
- Contribution to the concept of Common Application of Surveillance Tools, as for the European Border Surveillance System (EUROSUR) and to its interoperability with other systems.

**Type of Action: Innovation action**
**The conditions related to this topic are provided at the end of this call and in the General Annexes.**

**SU-GM02-2018-2020: Strategic pre-commercial procurements of innovative, advanced systems to support security**

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**Specific Challenge:**
Innovative solutions are needed when resources from different countries are required to work more closely together. Such solutions should support the development of the EU’s Security Union.

**Scope:**
- **Sub-topic 1: [2018] Common requirements specifications for innovative, advanced systems to support security (CSA)**

Practitioners from several countries are invited to work on common requirements of any kind of system that they may need in the future to enhance border and external security, to fight against crime and terrorism, to protect infrastructure, or to make societies more resilient, and to involve their respective procurement bodies in preparing for future acquisitions. Practitioner organisations may be private or public entities.

To ensure that the outcome of this action becomes also available to EU Member State national authorities as well as EU agencies not participating for further procurement purposes, proposals must necessarily state:

1. Agreement from participating procurement authorities to negotiate, in good faith and on a case-by-case basis, with non-participating procurement authorities that wish to procure a capability or a product fully or partly derived from this action, the use of the information required to run such a procurement process, and solely for that purpose.
2. Commitment from participating procurement authorities to consult with any legal entity generating information to be released for the purpose set out in paragraph (1), unless contrary to applicable legislation.
3. Commitment from participating procurement authorities to negotiate the use granted under paragraph (1) on Fair Reasonable and Non-Discriminatory (FRAND) terms.

The following options of the Model Grant Agreement will be implemented:
- Options on additional exploitation obligations of Article 28.1 of the Model Grant Agreement will be applied.
- Grants awarded under this topic will be complementary to the grant agreement under Sub-topic 2 of this Topic. The respective options of Article 2, and Article 41.4 of the Model Grant Agreement will be applied.

A subset of the domains addressed by the proposals selected for funding by the Commission further to this call will be continued with pre-commercial procurement activities in 2020.
Proposals should lead to solutions to be developed in compliance with European societal values, fundamental rights and applicable legislation, including in the area of free movement of persons, privacy and protection of personal data. Societal aspects (e.g. perception of security, possible side effects of technological solutions, societal resilience) have to be taken into account in a comprehensive and thorough manner. All participating procurement authorities should also commit...
to comply with EU data protection legislation in the development of innovative, advanced systems to support security and in particular with the principles of data protection by design and by default.

The Commission considers that proposals requesting a contribution from the EU of about 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.

- **Sub-topic 2: [2020] Procurement of prototype systems among those specified as a result of Sub-topic 1 (PCP)**

The Commission invites practitioners involved in projects funded under Sub-topic 1 to submit proposals for this PCP stage based on requirements resulting from those projects.

**Phase 1:** To finalise the tendering documents package for a call for tenders to build security-relevant prototypes based on the technical input resulting from Sub-topic 1 of this Topic. To define clear verification and validation procedures, methods and tools for the evaluation of the prototypes to be developed throughout the PCP stages;

**Phase 2:** To implement the call for tenders for research and development services. The call for tenders should envisage a competitive development composed of different stages that would lead to at least 2 prototypes from 2 different providers to be validated in real operational environment at the end of the PCP cycle;

**Phase 3:** To conduct the competitive development of the prototypes following the PCP principles including, at least, a design stage, an integration and technical verification stage and a validation in real environment stage. This process should be assessed following the procedures for verification and validation defined in the Phase 1;

**Phase 4:** To consolidate the results of the evaluation of the developed prototypes, extract conclusions and recommendations from the validation process, and to define a clear strategy for the further uptake of solutions. This strategy should consider joint-cross border procurement schemes and exploit synergies with other EU funds.

Proposals must build on the outcomes of the projects funded under Sub-topic 1. In order to guarantee a successful implementation of the PCP, proposals must provide clear evidence that such projects have delivered concrete outcomes on the following aspects:

- That the challenge is pertinent and that indeed a PCP action is required to complete the maturation cycle of certain technologies and to compare different alternatives;
- That there is a consolidated group of potential buyers with common needs and requirements which are committed to carry out a PCP action in order to be able to take an informed decision on a future joint-procurement of innovative solutions;
- That there is a quantifiable and identifiable community of potential buyers (including and beyond those proposed as beneficiaries in the proposal) who would share to a wide extent the common needs and requirements defined and who would be interested in exploring further joint-uptake of solutions similar to those developed under the PCP, should these prove to be technologically mature and operationally relevant by the end of the project;
- That the state of the art and the market (including research) has been explored and mapped, and that there are different technical alternatives to address the proposed challenge;
- That the future PCP tendering process is clear, that a draft planning has been proposed and that the supporting documentation and administrative procedures will be ready on due time in order to launch the call for the acquisition of R&D services according to the PCP rules.

To ensure that the outcome of this action becomes available for further procurement purposes to EU Member State national authorities as well as EU agencies not participating, the proposal must provide evidence of the following:

(1). Agreement from participating procurement authorities to negotiate, in good faith and on a case-by-case basis, with non-participating procurement authorities that wish to procure a capability or a
product fully or partly derived from this action, the use of the information required to run such a procurement process, and solely for that purpose;
(2). Commitment from participating procurement authorities to consult with any legal entity generating information to be released for the purpose set out in paragraph (1), unless contrary to applicable legislation;
(3). Commitment from participating procurement authorities to negotiate the use granted under paragraph (1) on Fair Reasonable and Non-Discriminatory (FRAND) terms.

The centre of gravity for technology development with actions funded under this subtopic is expected to be up to TRL 8 – see General Annex G of the Horizon 2020 Work Programme.

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 to 12 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Proposals should ensure that solutions will be developed in compliance with European societal values, fundamental rights and applicable legislation, including in the area of free movement of persons, privacy and protection of personal data. Societal aspects (e.g. perception of security, possible side effects of technological solutions, societal resilience) have to be taken into account in a comprehensive and thorough manner. All participating procurement authorities should also commit to comply with EU data protection legislation in the development of innovative, advanced systems to support security and in particular with the principles of data protection by design and by default.

Expected Impact: Short term:
- Common requirements for innovative prototypes agreed among the practitioner organisations involved in the action;
- Technical tender documents ready for use by subsequent pre-commercial procurement actions, as well as by non-participating procurement authorities;
- Common solutions to address urgent security challenges jointly developed, integrated and valuated;
- Potential demand for security solutions, inspired by those developed, is aggravated.

Medium term:
- To develop common technical specifications and reference performance levels for joint EU security solutions;
- To pave the road to market for technically mature and operationally relevant solutions and to accelerate their wide deployment in the EU.

Long Term:
- To contribute to narrowing down the gap between research and the market for the next generation of security solutions;
- To contribute to a single EU security market, by reducing market fragmentation and allowing exploitation of economies of scale;
- To facilitate access of new innovative players to the public procurement market;
- To contribute to reinforcing the competitiveness of the EU technology and industrial base.

Type of Action: Coordination and support action, Pre-Commercial Procurement

*The conditions related to this topic are provided at the end of this call and in the General Annexes.*
Call – Building a Low-Carbon, Climate Resilient Future: Next-Generation Batteries

LC-BAT-15-2020: Coordinate and support the large scale research initiative on Future Battery Technologies

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<tr>
<th>SwafS Key Word(s)</th>
<th>Public Engagement, Responsible Research and Innovation (RRI)</th>
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<tr>
<td>Deadline</td>
<td>16 January 2020</td>
</tr>
<tr>
<td>Topic Information</td>
<td>Link</td>
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**Specific Challenge:** To network and coordinate the large scale research initiative on Future Battery Technologies and its contribution to the broader efforts of the European research and innovation stakeholders in battery technologies foreseen at European level and in the Strategic Energy Technology (SET) Plan

**Scope:** Proposals are expected to coordinate the research activities and the stakeholders participating in the initiative; to facilitate communication, dialogue and cooperation on cross-cutting topics; to monitor the initiative’s progress and maintain its roadmap; to provide support for its governance; to promote and communicate the objectives of the initiative and its achievements, including by ensuring media presence and public visibility, by engaging with industry and society and by participating or organising outreach events; to identify training and education needs and promote European curricula in future battery technologies. In particular, proposals should identify and coordinate relevant efforts for modelling and data sharing, standardisation, IPR actions in cooperation with other relevant initiatives at European level. They should also help networking and collaboration with other relevant national and international activities in the field. They should cooperate with the ETIP on battery announced in the EU Strategic Action Plan on Batteries. It is expected that such an activity is driven by representatives of the relevant actors of the field (e.g., from academia, RTOs and industry).

The Commission considers that proposals for Coordination and Support Actions of a 3-year duration and 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 of another duration and/or requesting other amounts.

Note that special Grant Conditions will apply for projects granted under this topic. In particular, the project partners will need to conclude a collaboration agreement with the other projects selected from the topics LC-BAT-12-2020, LC-BAT-13-2020 and LC-BAT-14-2020 as indicated in the Grant Conditions. Please see under Call Conditions.

**Expected Impact:**
• Fostering the technological, economic and societal impact of the initiative and paving the way to industrial exploitation of future battery technologies in key energy or transport application domains

• Well-coordinated European initiative on future battery technologies, involving all relevant stakeholders and linked with relevant international, national and regional programmes.

• Spreading of excellence in future battery technologies across Europe, increased awareness of European activities and availability of European curricula in the field.

• Increased synergies and collaboration between the relevant research and innovation stakeholders in Europe as well as with major initiatives that already exist or are under preparation.

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.

Call – Competitive, Low-Carbon and Circular Industries

CE-SC5-31-2020: Develop, implement and assess a circular economy oriented product information management system for complex products from cradle to cradle

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<tr>
<th>SwafS Key Word(s)</th>
<th>Open Access/Open Data, Public Engagement, Responsible Research and Innovation (RRI)</th>
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<tr>
<td>Deadline</td>
<td>05 Feb 2020, 03 Sep 2020 (Second Stage)</td>
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<td>Topic Information</td>
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Specific Challenge: The transition to a circular economy requires that the value in products is retained as long as possible. To achieve this, reliable information about the composition of components and materials is needed for health and safety in repair and recycling enterprises and for improved user integration in sustainable product design and in new business models. Other aspects such as recyclability, dismantlability, recycled content, the sustainability of sourcing of raw materials, security of supply, and ultimately the overall environmental and social performance along the life cycle, are also related to the composition and design of products. If the downstream actors in the value chain, such as consumers, retailers or end-product manufacturers demand this information, it needs to be collected in the whole supply chain upstream. The implementation of resource efficiency benchmarks in products e.g. via Ecodesign or the EU Ecolabel also requires product composition and environmental performance data. The information needs of consumers are of course different from those of manufacturers and recyclers, and suppliers and manufacturers are traditionally worried about excessive transparency and possible violations of proprietary data rights. All this needs to be considered in the design of the information flow in the economic value chain. Although some manufacturers and suppliers use specific software for internal communication, upstream aggregation and compliance documentation for sectoral product legislation, this does not cover the critical information needs with regard to circularity or the
overall life cycle performance. Some SMEs, start-ups, and social and municipal enterprises outside the supply chain would benefit from access to such information management systems, but they have too limited resources to invest in complex and expensive software solutions.

There is thus a need for designing and piloting an information system for raw materials and components in products and their environmental performance that is linked to the material and value flows in an ideally circular system. The design should be flexible and smart with regard to data volume and conversions and should include the whole flow for a specific business, from raw materials supply via components to the finished product, including customers, repair business, refurbishers, and recyclers.

In addition, the flexibility should allow actors to use the data for compliance reasons, such as REACH or the (future) ECHA database on the presence of hazardous chemicals in articles (ECHA, 2018). It should also allow aggregation and extrapolation with a view to the analysis and mapping of raw material flows and needs in Europe. The concept, the data flow and the specific needs of each actor should be studied in a pilot with operators that are interested in making their business sustainable and future-proof.

**Scope:** Proposals are expected to bring together all relevant actors along product related value chains – product designers, producers, consumers, businesses providing repair or refurbishment, data provider and manager, sorters and recyclers. The selected products should have a major environmental impact, offer a high potential for circularity, have a complex supply chain, and be linked at both ends of the lifecycle to critical resource issues, e.g. the manufacturing industry, which includes amongst others textiles and plastics, construction and sectors with products that may contain critical raw materials. Where applicable, official nomenclature, such as used in Prodcom, should be used for all products and materials. Ideally, a fully functional system should be set up in a value chain with high internal quality standards and an established refurbishment business. The knowledge gained in this set-up should be comprehensive and systemic enough to be easily transferable to less complex sectors and business models. All information flows should be designed with a view to increased circularity, traceability and minimisation of the overall environmental footprint. Proposals should explore, develop and test integrated information flows that take into account the diverse information needs throughout and beyond the original lifecycle of the product.

To facilitate open innovation and transferability, open solutions such as open source software, open hardware design, and open access to data are encouraged. Results from the supported projects might play a central role in the further development of the policies for the transition to a circular economy. The ambition to grant open access to the underlying architecture such as databases, encryption and access rights management should therefore be a central element of the proposals, while adequately addressing possible data protection, user privacy and liability issues. Beneficiaries are encouraged to build value-added services based on the established architecture.

In order to facilitate project management, the development of respective technologies should be decentralised. Proposals are expected to provide quantitative information on the potential for transferring the implemented solution to the wider sector and to other relevant
sectors. Based on the pilot data, environmental benefits should be assessed from a lifecycle perspective and quantified using the Product Environmental Footprint (PEF) method, which has already been elaborated for certain product categories in cooperation with industrial partners. The social assessment part shall build on the work done in the context of the life cycle initiative and the Platform for Life Cycle Assessment. Economic benefits should also be assessed and quantified under a life cycle perspective.

**Participation of actors across the value chain,** e.g. material and product producers, end-user organisations, civil society organisations, repair and recycling businesses, etc. is considered essential. Specific information needs at each point in the value chain should be addressed in a satisfactory way, systemised, and the respective data generated out of the integrated information flow. An additional aim of this testing is to obtain a better understanding of the mutual dependencies between the several operators in the system. Clustering and cooperation with other selected projects under this cross-cutting call and other relevant projects is strongly encouraged.

Activities are expected to focus on Technology Readiness Levels (TRLs) 5-7.

Proposals submitted under this topic should include a business case and exploitation strategy, as outlined in the Introduction of this part of the Work Programme. The Commission considers that proposals requesting a contribution from the EU in the range of EUR 7-8 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:

- the development of new businesses related to the transition to a circular economy, and related value-adding consulting services;
- effective use of both primary and secondary resources in Europe, strengthening geopolitical resource independency, facilitating the market for secondary raw materials, closing material cycles, and reducing waste generation, environmental pollution and greenhouse gas emissions;
- achieving the targets of the EIP on Raw Materials, particularly in terms of feeding secondary raw materials knowledge into the EC Raw Materials Information System (RMIS);
- better insights into the material composition of products and the amount of secondary raw materials in circulation, increasing circularity of relevant material streams, and strengthening the use of PEF as the standard means for the assessment of the material efficiency and overall environmental performance of products;
- streamlined social life cycle assessment ensuring comparability and validity, allowing to critically review green claim and enabling consumers to take environmentally informed purchasing decisions, as well as allowing product designers and developers to take environmentally informed design decisions at an early stage;
- better insights on how to transfer successful information management approaches to other businesses and sectors.

**Type of Action:** Innovation action

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