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**Call Topics for International Cooperation
in Horizon 2020
EU and Brazil**

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Excellent Science

Horizon 2020 Pillar:	Excellent Science
Programme:	European research infrastructures (including e-Infrastructures)
Call Title:	Support to policy and international cooperation
Call Identifier:	H2020-INFASUPP-2018-2020
Topic Title:	Policy and international cooperation measures for research infrastructures
Topic Identifier:	INFASUPP-01-2018-2019
Type of Action:	RIA Research and Innovation action, CSA Coordination and support action
Deadline(s):	20-03-2019 (single-stage)

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/infrasupp-01-2018-2019.html>

Specific Challenges: High-quality, accessible research infrastructures are at the heart of the knowledge triangle of research, education and innovation. They enable tens of thousands of researchers in academia and industry to develop innovative ideas, products and services that foster European competitiveness and help tackle societal challenges facing our continent. However, ensuring the availability of state-of-the-art facilities requires multi-billion Euro long-term investments across the European Research Area. In the context of implementing the ERA Roadmap, the focus of this action is to set the conditions for effective investment and optimise the use of research infrastructures of European interest.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation for research infrastructures is needed with a number of key partners located in third countries/regions seen as strategic both for the development, exploitation and management of world-class research infrastructures and for ensuring the necessary complementarities on the international scene required to address research challenges with a global dimension by optimising the use of the available resources.

Scope:

Proposals will address the following sub-topic:

(d) Coordination and support actions for the 2019 deadline

Actions under this sub-topic, in line with the EU-**CELAC** SOM^[1]strategic approach^[2], will concretely build on the outputs of the newly established EU-**CELAC** Research Infrastructure Working Group, and will:

1. support the identification of priorities for regional and bi-regional cooperation based on the respective strategic road-mapping exercises;
2. foster the exchange of best practices between the EU and **CELAC** on issues of common strategic relevance such as regional road-mapping processes, research infrastructure management, RI staff development.
3. support the identification of a limited number of Research Infrastructures of bi-regional interest on which the project will have to conduct pilot cooperation demonstrators comprising:
 - The organisation of dedicated workshops and meetings between the EU and **CELAC** involved communities (research infrastructures, ministries, funding agencies). This can also be supported by bi-regional staff exchange activities, dedicated thematic training programmes (e.g. summer schools);
 - The development of specific roadmaps for cooperation for each of the pilot thematic dimensions and the initial implementation of identified actions, such as supporting reciprocal access to Research Infrastructures in the two regions by covering travel and subsistence costs;
 - The regular reporting to the EU-**CELAC** RI WG on the progress, for which an advisory board should be set up.

Under this sub-topic, legal entities established in Brazil and Mexico are eligible for funding from the Union.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 1.5 million would allow this activity to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:**(d) Coordination and Support actions for the 2019 deadline**

- strengthen the development of a consistent cooperation agenda with **CELAC**;
- develop the international outreach of the European research infrastructures' ecosystem;
- foster a global research area vision and the development of global research infrastructures;
- contribute to capacity building and research infrastructures human capital development in targeted/relevant regions;
- enhance the role of the Union in multilateral fora;

Cross-cutting Priorities: International cooperation

^[1] The Senior Officials Meeting (SOM) on Science and Technology of the EU-**CELAC** Joint Initiative on Research and Innovation (JIRI)

^[2] See <http://ec.europa.eu/research/iscp/index.cfm?pg=latin-america-carib>

Industrial Leadership

Horizon 2020 Pillar:	Industrial Leadership
Programme:	Leadership in Enabling and Industrial Technologies - Space
Call Title:	Space 2018-2020
Call Identifier:	H2020-SPACE-2018-2020
Topic Title:	International Cooperation Copernicus – Designing EO downstream applications with international partners
Topic Identifier:	DT-SPACE-06-EO-2019
Type of Action:	RIA Research and Innovation action
Deadline(s):	12-03-2019 (single-stage)

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/dt-space-06-eo-2019.html>

Specific Challenges: Copernicus, the Union's Earth observation and monitoring programme produces a wealth of data and information regarding the Earth sub-systems (land, atmosphere, oceans) and cross-cutting processes (climate change, emergency and security). Cooperation with international partners is key to promoting the uptake of Copernicus globally, exploiting possibilities for integrating in-situ, space data and information technologies. Building the Copernicus full, free and open data policy, the Commission seeks to facilitate access to Copernicus data and information for interested international partners. Administrative cooperation arrangements on Copernicus data access and earth observation data exchange have already been signed with the United States and Australia, and discussions towards similar cooperation have been started with other countries and regions (including Africa, **Latin American** countries and Asia-Pacific countries).

Cooperation with partner countries should be fostered with a view to using Copernicus data to jointly develop algorithms, services and/or products which serve local user needs and/or enhance the Copernicus global product quality.

Proposals are encouraged to use the Copernicus Data and Information Access Services (DIAS), or other existing data access solutions instead of setting up their own download and processing infrastructure. They are also encouraged to integrate third-party data (including in-situ data) and envisage data assimilation into models and products made available on the Copernicus platform of the Copernicus services..

For such applications and developments to succeed in the market or with public users, the products need to be shaped according to users' needs and their value to users must be openly demonstrated to the wider user community. This needs

to be achieved in an environment integrated at the level of the user, in order for users to accept the innovative potential which the product promises. This will require also specific attention to be given to the various processes in place in the users' workflows which incorporate the EO information. Furthermore, the transition of R&D product prototypes to viable commercial product lines after the end of the EU funded phase remains a challenge to be addressed early on during product development.

Scope: Proposals shall address a wide variety of applications stemming from the use of Earth observation and their smart integration with other related technologies. Copernicus should be considered as part of the solution which may include other space or non-space inputs. This is likely to lead to greater value, opportunities and especially market uptake. Applications shall be sustained by a production process capable of delivering to the user a product which is validated and accepted as a marketable product in the international partner country. International collaboration has a key role to play in this context, as it enhances access to markets beyond the national borders, notably by enabling space application providers to absorb market-related tacit knowledge and know-how of their partners. Corresponding validations and customisations are to be undertaken, and the business case for the application is to be demonstrated. Service level models are to be developed, with appropriate quality of service definitions for the application. Application products are expected to adopt open standards for data documentation, data models and services including data processing, visualisation and cataloguing on a large scale.

Tasks shall include joint calibration and validation activities or integration of local in-situ systems to enhance the quality of data and service products. It is important to exploit the added value of integration of EO observation technologies (both satellite, airborne and ground based) with positioning ones, and ICT (enhancing new frontiers opened by cloud computing) from international partner countries through the development of applications, and encourage their insertion into the market.

The choice of EO application is left to the proposer.

Applicants are advised to consult further information on the availability of Copernicus Sentinel Data, access to Copernicus Contributing Mission data, as well as issues recommended to be detailed in the proposals via the Commission's Copernicus website^[1].

For proposals under this topic:

- Participation of at least one partner from a country that has signed a Copernicus Cooperation Arrangement^[2] is required;
- Participation of industry, in particular SMEs, is encouraged;
- Involvement of post-graduate scientists, engineers and researchers is encouraged, for example through professional work experience or through fellowships/scholarships as applicable;
- Participation of partners involved in international **GEO Initiatives** is encouraged.

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.

This topic contributes to the Horizon 2020 focus area "Digitising and transforming European industry and services".

Expected Impact:

- Establish sustainable supply chains for innovative EO value added products and services with demonstrated commercial value with international client communities;
- Complete integration, based on international standards, into the customer's existing business processes and processing chains, as well as the economic viability of the application is to be demonstrated;
- Enhance the European industry's potential to take advantage of market opportunities and establish leadership in the field and to boost business activity;
- Lead to new or improved products, processes or services on the market that are capable of generating within 3 years after the end of public funding a significant turnover for the participants, and create new jobs;
- Lead to an improved quality of the Copernicus global product, thereby enhancing the stating of Copernicus data and information in a global environment and **GEOSS**.

Cross-cutting Priorities: International cooperation

^[1] <http://www.Copernicus.eu/main/data-access>

^[2] See Copernicus.eu for list of countries concerned

Societal Challenges

Horizon 2020 Pillar:	Societal Challenges
Programme:	Climate action, environment, resource efficiency and raw materials
Call Title:	Building a low-carbon, climate resilient future: climate action in support of the Paris Agreement
Call Identifier:	H2020-LC-CLA-2018-2019-2020
Topic Title:	Inter-relations between climate change, biodiversity and ecosystem services
Topic Identifier:	LC-CLA-06-2019
Type of Action:	RIA Research and Innovation action
Deadline(s):	19-02-2019, 04-09-2019 (two-stage)

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/lc-cla-06-2019.html>

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

Scope: Actions should investigate at all relevant spatial and temporal scales the way that ecological processes, biodiversity (including terrestrial and/or marine ecosystems as appropriate) and ecosystem services are impacted, both directly and indirectly, by climate change. Actions should consider the interactions and feedbacks between climate change and biodiversity, ecosystem functions and services. The vulnerability of biodiversity and ecosystems functions and services to climate change should be investigated and modelled across a range of European (including other European territories) climatic and ecological regions; this includes human activities with relevance to climate change. They should account for social, ecological and economic aspects and climate change relevant stressors and sources of uncertainty. These should include tipping points and safe operating spaces. The role of nature-based solutions^[1] in enhancing the

efficiency and effectiveness of climate change adaptation and mitigation strategies should be assessed and synergies with other pollution-reducing environmental policies be explored. Work should build, as appropriate, on existing knowledge and activities such as relevant FP7/Horizon 2020 and LIFE projects, European climate adaptation platforms and Copernicus Services, in particular on climate change, land monitoring and marine environmental monitoring, and contribute to long-term monitoring initiatives.

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, in particular with **CELAC**^[2] countries.

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

Expected Impact:

The project results are expected to contribute to:

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

Services (IPBES), the Intergovernmental Panel on Climate Change (IPCC) and further relevant global processes and organisations.

Cross-cutting Priorities: International cooperation, Blue Growth. Socio-economic science and humanities

^[1] A definition is provided in the introductory text of this Work Programme

^[2] Community of **Latin American and Caribbean** States

Horizon 2020 Pillar:	Societal Challenges
Programme:	Climate action, environment, resource efficiency and raw materials
Call Title:	Greening the economy in line with the Sustainable Development Goals (SDGs)
Call Identifier:	H2020-SC5-2018-2019-2020
Topic Title:	Strengthening international cooperation on sustainable urbanisation: nature-based solutions for restoration and rehabilitation of urban ecosystems
Topic Identifier:	SC5-13-2018-2019
Type of Action:	RIA Research and Innovation action
Deadline(s):	19-02-2019, 04-09-2019 (two-stage)

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/sc5-13-2018-2019.html>

Specific Challenges: Unsustainable, non-resilient urbanisation patterns, the expansion or neglect of urban areas have caused the fragmentation, depletion and destruction of habitats, biodiversity loss and the degradation of ecosystems and their services. Increasing connectivity between existing, modified and new ecosystems and restoring and rehabilitating them within cities and at the urban-rural interface through nature-based solutions^[1], is necessary to enhance ecosystem resilience and adaptive capacity to cope with the effects of climate and global changes and to enable ecosystems to deliver their services for more liveable, healthier and resilient cities.

Scope: Actions should develop models, tools, decision support systems, methodologies, strategies, guidelines, standards and approaches for the design, construction, deployment and monitoring of nature-based solutions and restoration, prevention of further degradation, rehabilitation and maintenance measures for urban and peri-urban ecosystems and the ecological coherence and integrity of cities. Actions should review and capitalise upon existing experiences and good practices in Europe and (for option a) China or (for option b) **CELAC**. The strategies and tools should be part of an integrated and ecologically coherent urban planning and city-making process that would secure a fair and equitable distribution of benefits from the restored urban ecology and limit its exposure to environmental stresses. Methodologies, schemes and indicators should be developed to allow for the assessment of the cost-effectiveness of the restoration measures, also accounting for their possible negative effects. They

should account for the totality of the benefits delivered by the restored ecosystems in terms of, for example, enhancing cities' climate-proofing and resilience, enhancing mitigation options, improving human health and well-being, reducing inequalities and reducing cities' environmental footprint. Actions should also dedicate efforts to awareness raising, outreach activities and education of citizens, including school children about the benefits of nature for their social, economic and cultural well-being.

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

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

To ensure that knowledge, evidence and capacity developed within the framework of this topic covers an as broad range of conditions and urban contexts as possible across Europe, urban and peri-urban areas and ecosystems funded through projects under sub-topic a) are not invited to sub-topic b). Exceptions may be made on a case-by-case basis, provided that applicants can duly and convincingly justify the added value – in terms of additional knowledge, evidence and capacity regarding nature-based solutions for restoration and rehabilitation of urban ecosystems – of addressing the same area(s) under sub-topic b) in addition to them being covered through a project funded under sub-topic a). The appropriate use of Horizon 2020 resources in funding such cases will be assessed during the evaluations and the potential granting process.

The participation of social sciences and humanities disciplines, addressing also the gender dimension, is crucial to properly address this topic. Cooperation and synergies with the activities undertaken within the Covenant of Mayors initiative for Climate and Energy^[2] initiative (supported by the EC) should be sought where appropriate.

Actions should address the following sub-topic:

- a) Strengthening EU-China collaboration (2018, closed)
- b) Strengthening EU-**CELAC** collaboration (2019)

The possibility for participants from some **CELAC** countries to apply for funding under national co-funding mechanism should be explored^[3].

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:

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

Cross-cutting Priorities: International cooperation, RRI, Open Innovation, Socio-economic science and humanities, Gender, Clean Energy

^[1] A definition is provided in the introductory text of this Work Programme

^[2] <https://www.covenantofmayors.eu/>

^[3] See http://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/international-cooperation_en.htm#support-non-eu-countries

Horizon 2020 Pillar:	Societal Challenges
Programme:	Climate action, environment, resource efficiency and raw materials
Call Title:	Greening the economy in line with the Sustainable Development Goals (SDGs)
Call Identifier:	H2020-SC5-2018-2019-2020
Topic Title:	Multi-stakeholder dialogue platform to promote nature-based solutions to societal challenges: follow-up project
Topic Identifier:	SC5-23-2019
Type of Action:	CSA Coordination and support action
Deadline(s):	04-09-2019 (single-stage)

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/sc5-23-2019.html>

Specific Challenges: Nature-based solutions (NBS) have a high – but largely untapped – potential for delivering multiple ecosystem services (such as carbon sequestration, soil and water retention and purification, pollination, increased human well-being...) to address diverse societal challenges with a systemic and innovative approach. An effective and self-sustainable multi-stakeholder platform that fosters dialogue, interactions, knowledge and information sharing, collaboration and think-and-do-tanks among relevant stakeholders is necessary to support the understanding and promote the use of nature-based solutions and speed up market up-take. Stakeholders include science, policy, administration, business (including SMEs), society (including NGOs, CSOs, and citizens as appropriate), public and private investors.

The establishment of such platform is currently being undertaken by ThinkNature^[1], with support from Oppla^[2] and Biodiversa^[3]. ThinkNature is an ongoing CSA funded under SC5 WP 2016 that is due to terminate end 2019. The Oppla portal is developing as the EU NBS knowledge repository, supporting access, sharing and marketing of nature-based solutions knowledge, including from NBS EU-funded projects.

Scope: The action should aim to build upon the achievements of ThinkNature and further develop and consolidate an effective and self-sustainable EU community of innovators and practitioners and think-and-do-tanks to promote the design, development, replication and upscaling of nature-based solutions at the European and global scale.

The action should, on the basis of continuous and strategically driven stakeholder dialogue, exchanges of practices and experiences and sharing of expertise related to the various social, economic, financial, environmental, educational, institutional, regulatory and cultural NBS-relevant aspects, across multiple scales (local, regional, national and EU):

- further develop and maintain an online open source stakeholders platform that would facilitate the interactions;
- develop a business plan to make such a platform financially self-sustainable;
- identify specific domains and priorities where further research and innovation is needed for marketable nature-based solutions;
- establish NBS hubs and organize communication and outreach campaigns and regular events in all Member States, involving, as appropriate, international networks and environmental communicators and targeting all relevant stakeholders involved, including the scientific community, in the overall NBS value chain;
- facilitate the clustering of current and upcoming EU-funded nature-based solutions relevant research and innovation projects and other EU or national initiatives;
- assist the European Commission in organizing science-policy workshops and drafting briefings and contributions to EU policies related to nature, environment, climate, water, etc. Appropriate links with other relevant policy platforms such as Climate-ADAPT^[4] and BISE^[5] should be ensured;
- develop guidelines for practitioners with state-of-the-art NBS design practices, protocols and standards;
- facilitate the development and mainstreaming of NBS-related professional training and the inclusion of NBS in high-education curricula (as, for example, NBS for architects and urban planners; ecosystem services for engineers, etc.), and Masters;
- promote international cooperation with key strategic international partners^[6];
- proposals shall address all of the above points. The platform must ensure that all evidence, data and information will be accessible through the Oppla portal.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 2 million for a period of up to 4 years 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 lead to:

- effective and self-sustainable EU community of innovators, practitioners and think-and-do-tanks; identification of knowledge gaps and user needs; assessment of market potential for NBS;
- enhanced awareness among public authorities, the private sector and society at large about the advantages and any risks of NBS and therefore a wider use of these solutions as opposed to or in combination with grey infrastructure;
- improved cooperation and synergies with key strategic international partners and the emergence of a global market for nature-based solutions.

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

[1] <https://www.think-nature.eu/>

[2] <https://oppla.eu/> Developed by FP7-funded projects OPERAs and OpenNESS for knowledge on ecosystem services, natural capital and nature-based solutions;

[3] <http://www.biodiversa.org/> Funded under the Horizon 2020 ERA-NET COFUND scheme

[4] <http://climate-adapt.eea.europa.eu/>

[5] <https://biodiversity.europa.eu/>

[6] Such as **CELAC** countries, China, **Belmont Forum**, South East Asia

Horizon 2020 Pillar: Societal Challenges

Programme: Europe in a changing world – Inclusive, innovative and reflective societies

Call Title: MIGRATION

Call Identifier: H2020-SC6-MIGRATION-2018-2019-2020

Topic Title: International protection of refugees in a comparative perspective

Topic Identifier: MIGRATION-07-2019

Type of Action: RIA Research and Innovation action

Deadline(s): 14-03-2019 (single-stage)

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/migration-07-2019.html>

Specific Challenges: While policy areas such as development or trade benefit from global governance structures, a global refugee governance regime is still in its infancy. The challenge is to safeguard international law standards on the treatment of asylum seekers and internally displaced persons, address imbalances in sharing responsibilities, and ensure the EU plays a key role globally while also aligning the reform of its common asylum system to feed into the emerging regime of global asylum governance.

Scope: Proposals should examine the processes and content of the emerging international protection system, e.g. following the United Nations commitment for the adoption of a global asylum compact as well as its implementation in comparative perspective, with special focus on the EU's role and engagement. They should examine how sharing responsibilities, transferring skills and capabilities, can be organised as well as the compatibility of the emerging global asylum regime with international law, including international conventions on refugees and human rights. The EU arrangements with refugees' origin and transit countries should be assessed. Proposals should advise on the future development of asylum policies and their implementation both globally and within the EU, also addressing issues around both gender issues and equality. They should include comparative assessment of existing legal responses to protection needs and explore future options and their compatibility with international refugee law, with a view to also identifying durable solutions. Particular attention should be paid to the protection of vulnerable groups such as minors, unaccompanied or with their families, including from all forms of abuse and exploitation, and women and girls from gender-based violence and

discrimination. International cooperation is encouraged, in particular with Canada, **Brazil**, South Africa and Jordan, as well as relevant international organisations. Furthermore, the involvement of refugee and migrant scientists and scholars from relevant disciplines is strongly encouraged.

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: The action will significantly advance the knowledge base on global migration and asylum governance by evaluating the process, discourses and outcomes of the planned compact on refugees. The action will assist European policymakers with identifying suitable strategies for engagement in the process leading to the implementation of the global refugee compact. They will also inform the EU's reform process of its common asylum system.

Cross-cutting Priorities: International cooperation, Gender

Horizon 2020 Pillar:	Societal Challenges
Programme:	Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bioeconomy
Call Title:	Blue Growth
Call Identifier:	H2020-BG-2018-2020
Topic Title:	All Atlantic Ocean Research Alliance Flagship
Topic Identifier:	BG-08-2018-2019
Type of Action:	RIA Research and Innovation action
Deadline(s):	23-01-2019, 04-09-2019 (two-stage)

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/bg-08-2018-2019.html>

Specific Challenges: The Atlantic Ocean is an invaluable shared resource. The societal value of its blue economy is enormous for countries located on its shores. There are however, still considerable gaps in our knowledge and understanding of processes related to this ocean especially with regard to its chemistry, ecology, biodiversity, impacts of climate and the potential for the sustainable exploitation of its natural resources including aquaculture. The Atlantic Ocean is subject to a range of pressures, such as impacts related to climate change, pollution, fishing above sustainable levels, mining and coastal eutrophication. Both remote and local forces play a role in these changes and it is necessary to consider local, regional and basin-wide drivers and factors to understand, predict and adapt to change. Furthermore, the potential of seafood to reduce food and nutrition insecurity calls for collaboration at international level. Having already demonstrated how successful research cooperation can be in the North Atlantic Ocean^[1] in tackling some of these issues, the objective now is to take a systemic approach to tackle the scientific and socio-economic challenges and to move towards a basin-wide cooperation from Antarctica to the Arctic, through enhanced cooperation with countries bordering the South Atlantic, notably **Brazil** and South Africa^[2].

Scope: The actions shall aim at understanding and sustainably managing the Atlantic Ocean as a whole, through a large-scale basin effort involving both the northern and the southern parts of this ocean and its interlinks with the adjacent areas. In order to achieve this, it is necessary to bring together and systematically connect scientists, stakeholders, data, knowledge, expertise, capacities, and resources. This is only feasible through the synergistic cooperation among the bordering countries. With the development of a South Atlantic Ocean Science Plan^[3]

focusing on the challenges and research needs of the South Atlantic Ocean, which are also interconnected with the challenges and research needs of the North Atlantic Ocean, this cooperation can converge towards the implementation of a systemic approach by linking and jointly tackling the climate-food-ocean challenges. Overall, activities shall contribute to upscale cooperation along and across the Atlantic Ocean and the creation of long-term partnerships building on on-going initiatives such as the All Atlantic Ocean Research Alliance. In order to realise this, proposals shall address one of the following sub-topics:

[B] 2018-2019- Assessing the status of Atlantic marine ecosystems. Activities shall enhance the knowledge on the status and dynamics of Atlantic marine ecosystems, quantifying main drivers of short and long-term change, examine the interactions between different stressors, including climate change, and the role of cumulative impacts on ecosystem functioning and associated ecosystem services. They shall also contribute to improve the sustainability of the exploitation of the marine resources, through extending climate based predictions as well as testing for so-called tipping points, regimes shifts or more advanced assessments of ecosystem stability. Activities may entail 3D-mapping of the water column and high resolution seafloor mapping of selected large areas (including relevant marine ecosystems), considering the feasibility/safety and sustainability of these maritime operations. Mapping shall include variables of a different nature, such as physical, biological, chemical, habitats, seafloor characteristics and integrity (including in relation to climate change) and may require the development of new technologies. Furthermore, demonstration of cost-effective approaches to management and processing of the large quantities of data, better coordinated data sharing and operability, as well as the development of improved forecasting capabilities of stressors, tipping points, recovery and changes in ecosystem state will be important. The participation of industrial and regional stakeholders is encouraged to help define ecosystem-requirements. All data collected by the projects (including in international waters) shall be made open access by the end of the project. The choices of the selected areas need to be justified. Actions shall include capacity building and training with/in countries bordering the South and Tropical Atlantic Ocean. Links with ongoing initiatives such as EMODNet should be considered. The activities will be carried out in close co-operation with relevant Commission services (Directorate-General for Research and Innovation), ensuring coherence with related policy initiatives.

[C] 2018-2019- New value chains for aquaculture^[4] production. Activities shall explore new species, products and/or processes for aquaculture production (including algae). They shall consider existing, emerging and potential markets, take into consideration sound cost-effective production methods, sustainability and profitability. Consideration shall be given to the design of Internet of Things (IoT) approaches in the development of innovative production technologies, including new/improved biosensors, the circularity of the processes with the objective of zero waste and consider consumers' concerns and demands. The development of monitoring programmes for risk

assessment including emerging pollutants and climate change resilience and mitigation will be essential. Activities shall contribute to reduce risks to human health. They will also foster higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors. Finally, it will be important to reinforce capacity building by aligning training programmes, including through industrial apprenticeship opportunities and networking along and across the Atlantic Ocean, in particular, but not exclusively, with South Africa and **Brazil** and other Atlantic Ocean coastal states. Reinforcing links between industrial partners is also crucial to exchange best practices and to facilitate the creation of business opportunities, therefore the SME participation in this topic is encouraged.

The Commission considers that proposals requesting a contribution from the EU respectively in the range of EUR 9 million for sub-topic [B] (Research and Innovation Action) and EUR 8 million for sub-topic [C] (Research and Innovation Action) would allow this specific challenge to be adequately addressed. Nonetheless, this does not preclude the submission and selection of proposals requesting other amounts.

Consortia submitting proposals to this Flagship are encouraged to include participants from countries bordering the Atlantic Ocean (North and South) as their active participation is key to the success of the proposals.

Proposals shall include a task to cluster with other projects financed under this topic and – if possible – with other relevant projects in the field funded by Horizon 2020. Possible links with related research and innovation activities supported by the **Belmont Forum**^[5] on Ocean sustainability shall also be considered.

Expected Impact: In order to contribute to the implementation of the EU Integrated Maritime Policy and its related Atlantic Strategy and Action Plan, the EU Blue Growth Strategy, the EU Marine Strategy Framework Directive, the EU Maritime Spatial Planning Directive, the EU International Ocean Governance Communication, the EU Communication for a Sustainable European Future, the UN SDGs, the EU Food 2030^[6] process for food and nutrition security, as well as the Atlantic Ocean Research Alliance, activities shall:

In the short term:

- Contribute to the implementation of the EU-**Brazil**-South Africa **Belém Statement** on Atlantic Ocean Research and Innovation cooperation (sub-topics B & C)^[7].
- Contribute to create the right conditions for the development of better and accurate monitoring, modelling, planning, management and prediction capacities in the whole Atlantic (sub-topic B).
- Develop ecosystem assessments and forecasts as well as a deeper understanding of vulnerabilities and risk including those relating to the global climate system and the impacts of climate change (sub-topic B).

- Increase the competitiveness of the EU's blue economy by developing new technologies to service societal needs and new value chains (sub-topics B & C).
- Create a lasting partnership on sustainable aquaculture business opportunities for industrial partnerships between Europe and countries bordering the South Atlantic (sub-topic C).
- Contribute to creating sustainable food production systems and implementing resilient aquaculture practices that increase productivity and production, help maintain healthy and productive aquatic ecosystems and strengthen capacity for adaptation to climate change (UN SDG 2) (sub-topic C).
- Contribute to the sustainable management and protection of marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans (UN SDG 14) (sub-topic B).

In the medium term:

- Contribute to the development of ecosystem services to ensure the long-term sustainable management of marine resources (UN SDG 14) (sub-topic B).
- Ensure that nutritious and safe food is available, accessible and affordable for all while conserving natural resources and contributing to climate change mitigation (UN SDG 2 and SDG 13) (sub-topic C).
- Contribute to achieving a zero waste European aquaculture system by strengthening the sustainability, resilience and robustness of industry, by 2030 (sub-topic C).
- Increase EU leadership in ocean technology developments (sub-topics B & C).
- Increase consumers' trust and confidence in seafood products (sub-topic C).
- Create a well trained workforce able to tackle the multi-sectoral, multi-disciplinary challenges and opportunities of the Atlantic Ocean (sub-topic C).
- 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 (sub-topics B & C).

Cross-cutting Priorities: Socio-economic science and humanities, Blue Growth, International cooperation

^[1] EU-Canada-US Galway Statement on Atlantic Ocean Cooperation, May 2013

^[2] EU-Brazil-South Africa **Belém Statement** on Atlantic Research and Innovation Cooperation, July 2017

^[3] South-South Framework for Scientific and Technical Cooperation in the South and Tropical Atlantic and Southern Ocean

^[4] In this context, 'Aquaculture' comprises the farming of aquatic organisms (including fish, shellfish, algae and aquatic plants) in all types of controlled or natural water environments (fresh, brackish and seawater).

^[5] <https://www.belmontforum.org/>

^[6] European Research and Innovation for Food and Nutrition Security, SWD(2016)319.
<http://ec.europa.eu/transparency/regdoc/rep/10102/2016/EN/SWD-2016-319-F1-EN-MAIN.PDF>

^[7] EU-Brazil-South Africa **Belém Statement** on Atlantic Research and Innovation Cooperation, July 2017

Horizon 2020 Pillar:	Societal Challenges
Programme:	Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bioeconomy
Call Title:	Rural Renaissance
Call Identifier:	H2020-RUR-2018-2020
Topic Title:	Closing nutrient cycles
Topic Identifier:	CE-RUR-08-2018-2019-2020
Type of Action:	IA Innovation action
Deadline(s):	23-01-2019 (single-stage)

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/ce-rur-08-2018-2019-2020.html>

Specific Challenges: The EU depends strongly on external sources for the supply of key fertilisers used in agriculture. Resource depletion and an increasing global demand for mineral fertilisers may, in the long term, lead to price tensions with an impact on food security. Mineral-based fertilisation also poses significant environmental problems, linked e.g. to the amounts of fossil energy needed to produce and transport these fertilisers. At the same time, large amounts of minerals are being dispersed in the environment through a large variety of organic waste streams, resulting in soil, water and air pollution. Agro-food specialisation has led to regional imbalances: whilst in some regions a nutrient overabundance is causing severe environmental impacts (e.g. nitrate pollution), other are experiencing nutrient deficits. These contrasting effects may also be observed between locations within the same region.

Several technologies are being developed to recover and re-use nutrients from organic by-products, but many are insufficiently mature and the characteristics of end-products do not always match end-user preferences. It is expected that the EU 'circular economy package' will boost the emergence and commercialisation of such new fertilisers, hence it is important to understand their agronomic and environmental performance in order to establish adequate policies, guidelines and application rules.

Scope: Proposals shall address inter-regional and intra-regional imbalances through effective nutrient recovery from by-products of the agro-food or the forestry sectors, and conversion into novel fertilisers. Proposals should include a task to cluster with other projects financed under this topic, under topic SFS-39-2019 and – if possible – with other relevant projects in the field funded by Horizon 2020 (including under the BBI JU).

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

B.[2019] Bio-based fertilisers from animal manure (IA)

Projects shall demonstrate processes for recovery of mineral nutrients and production of novel fertilisers from animal manure. Proposals shall perform a thorough analysis of the state of the art, and demonstrate that the activities proposed go beyond past or ongoing research, without overlaps. Technologies that are currently under development shall be further improved, and possibly integrated, to produce high quality end-products^[1]. Proposals shall address end-product marketability, safety, sustainability including emissions of greenhouse gasses and pollutants, and compliance with relevant EU regulations^[2]. Their suitability and acceptability under the organic farming regulatory framework shall also be analysed. An integrated assessment of the business model (economic, agronomic, social and environmental) shall be performed. The whole value chain shall be demonstrated to a near-commercial scale (TRL 6-7). Proposals shall fall under the concept of the 'multi-actor approach'^[3] including relevant actors such as agro-food industries, technology providers, research centres, end-users (farmers and farmer associations), or public administration.

C.[2020] Bio-based fertilisers from other by-products of the agro-food, fisheries, aquaculture or forestry sectors (IA)

The Commission considers that proposals requesting a contribution from the EU of up to EUR 6 million for sub-topic A and 8 million for sub-topics B and C would allow this specific challenge to be addressed appropriately. Nonetheless this does not preclude the submission and selection of proposals requesting other amounts. For sub-topics B and C, participation of partners from **CELAC** countries^[4] is encouraged.

Expected Impact: Proposals are expected to provide the technologies needed to develop a new generation of commercial, sustainable and safe fertilisers based on organic by-products, and the scientific knowledge needed to frame their use. This will help to:

- replace conventional, non-renewable mineral fertilisers, hence reducing external dependence and risks related to depletion (sub-topics B and C);
- balance nutrient concentrations between or within regions, thus increasing resource efficiency (sub-topics B and C);
- reduce the environmental impacts linked to the dispersion of nutrients present in waste flows, or to the production of fossil-based fertilisers (sub-topics B and C);
- develop new business models creating value from agro-food, fisheries, aquaculture or forestry by-products (sub-topics B and C).

In the long term, this shall contribute to a thriving, sustainable and circular bio-economy, the development of new business models that are synergic with other economic sectors, and therefore to the creation of wealth and quality jobs in rural areas.

Delegation Exception Footnote: It is expected that this topic will continue in 2020

Cross-cutting Priorities: RRI, Socio-economic science and humanities, Blue Growth

^[1] These can be mineral-type (i.e. with low organic matter content), or advanced organic fertilisers (e.g. through improved composting processes).

^[2] This includes notably regulations relative to fertilisers, animal by-products, or nitrates.

^[3] See definition of the 'multi-actor approach' in the introduction to this Work Programme part.

^[4] Community of **Latin American and Caribbean** States

Horizon 2020 Pillar:	Societal Challenges
Programme:	Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bioeconomy
Call Title:	Sustainable Food Security
Call Identifier:	H2020-SFS-2018-2020
Topic Title:	European Joint Programme on agricultural soil management
Topic Identifier:	LC-SFS-20-2019
Type of Action:	COFUND-EJP COFUND (European Joint Programme)
Deadline(s):	23-01-2019 (single-stage)

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/lc-sfs-20-2019.html>

Specific Challenges: Good agriculture soil management^[1] contributes to food security, climate change mitigation/adaptation and ecosystem services. Preserving and increasing fertility of soils, not least through their organic content and water retaining capacity, increases agricultural production. Soils and their carbon, nitrogen and phosphorus content are also important for climate change mitigation. A number of good soil management practices have been developed to deal with some of the challenges; however serious knowledge gaps exist, e.g. on the characteristics of soils in various regions of Europe, the factors influencing their fertility functions including their capacity to store carbon, depending on different climate and environment conditions. The European Union is committed to addressing climate change with ambitious targets. An integrated framework for soil research in Europe is required to overcome current fragmentation and unleash the potential of agricultural soils to contribute to climate change mitigation/adaptation, while preserving or increasing agricultural functions.

Scope: The European Joint Programme will boost soil research with main emphasis on agricultural soil management and its contribution to climate change mitigation and adaptation. The aim is to construct a sustainable framework for an integrated community of research groups working on related aspects of agricultural soil management^[2]. The activities should look at how management of agricultural soils can reduce degradation of land and soils (in particular soil erosion and loss of organic matter), preserve and increase fertility of soils and how the processes related to organic content and water retaining capacity can support mitigation and adaptation to climate change. The EJP will evaluate and foster implementation of novel technologies for soil management and carbon sequestration. The aim of the EJP is also to look for synergies between different

approaches used in Europe for farm level accounting of emissions and removals from agricultural activities and particularly of carbon storage. In doing so, activities will contribute to improving inventories, measurements, reporting and accounting activities at different scales. Sustainable agricultural productivity and environmental aspects will also be targeted in connection with climate change mitigation and adaptation, so that optimisation of land management is ensured.

The European Joint Programme will include joint programming and execution of research and other joint integrative activities such as education and training (e.g. short-term missions, workshops), knowledge management, access to experimental facilities and databases, including also harmonisation, standardisation. Farmers, landowners and other stakeholders should be included in research activities as appropriate in the spirit with the multi-actor approach^[3].

State-of-art technologies for mapping and soil sampling and analysis (physical, chemical and biological parameters) should be explored for wider and simple use at various levels. In return, by e.g. developing new ICT tools, this could help farmers to protect and manage soils in line with current scientific understanding of processes. The EJP should also facilitate sampling and further development of LUCAS^[4] –European Soil Database as well support EU contribution to global soil mapping activities.

Participating legal entities must have research funding and/or management responsibilities in the field of agriculture soil management.

The proposal should include a five-year roadmap describing the key priorities and governance processes as well as the first annual work plan.

The acquired knowledge should support policy making in the domain of agricultural soil management and related areas, such as agriculture, climate and environment, and when feasible and appropriate knowledge exchange between science and practice for better agricultural soil management by farmers should be envisaged.

The activities will need to be coordinated as appropriate with other international soil related activities under the United Nations umbrella among them the **Global Soil Partnership** and more particularly with European Soil Partnership node; with **The Global Research Alliance on Agricultural Greenhouse Gases**; Horizon 2020 project CIRCASA^[5]; 4% Initiative: soils for food security and climate; Joint Programming Initiatives (FACCE, CLIMATE); the **Belmont Forum** and soil activities coordinated by the European Commission Joint Research Centre ^[6] when relevant and appropriate. The work of the EJP will also support a number of policies: the Common Agricultural Policy, Climate Change related policy and relevant environmental policies, in particular the implementation of the EU Soil Thematic Strategy^[7].

Financial support provided by the participants to third parties is one of the aims of this action and, in order to achieve the objectives of the action, the 60 000 EUR threshold provided for in Article 137(1)(c) of the Financial Regulation N°966/2012 and Article 210(a) of the Rules of Application Regulation N°1268/2012 can be exceeded.

Considering the budget available, the scope covered and the potential entities for the EJP, the Commission considers that an EU contribution to a maximum 50% of the total eligible costs of the action or up to 40 million EUR would allow this specific challenge to be addressed appropriately.

Expected Impact: The project will lead to significant long term alignment and implementation of soil-related research strategies and activities at national and EU level by:

- fostering understanding of soil management and its influence on climate mitigation and adaptation, sustainable agricultural production and environment;
- understanding how soil carbon sequestration can contribute to climate change mitigation at regional level including accounting for carbon;
- strengthening scientific capacities and cooperation across Europe including training of young soil scientists;
- Supporting harmonised European soil information, including for international reporting;
- fostering the uptake of soil management practices which are conducive to climate change adaptation and mitigation;
- developing region-specific fertilisation practices considering the local soil, water and pedo-climatic conditions;

In the long term, the programme will strengthen the role of the farming sector as a steward of land and soil resources. It will increase its capacity to adapt to climate change and contribute to mitigation and carbon sequestration.

^[1] Soil management includes: soil conservation, soil fertility and soil biodiversity.

^[2] Agro-forestry is included in the topic.

^[3] See definition of the 'multi-actor approach' in the introduction of this Work Programme part.

^[4] Land use/cover area frame statistical survey, abbreviated as LUCAS, is a European field survey program funded and executed by Eurostat http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Land_use/cover_area_frame_survey_%28LUCAS%29

^[5] Project selected under SFS-50-2017 topic

^[6] European Soil Data Centre; EIONET - European Environment Information and Observation Network – soil network

^[7] COM(2006)231

Horizon 2020 Pillar: Societal Challenges

Programme: Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bioeconomy

Call Title: Blue Growth

Call Identifier: H2020-BG-2018-2020

Topic Title: The Future of Seas and Oceans Flagship Initiative

Topic Identifier: BG-07-2019-2020

Type of Action: IA Innovation action

Deadline(s): 23-01-2019 (single-stage)

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/bg-07-2019-2020.html>

Specific Challenges: 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^[1]). It will also support the Collaborative Research Action on Oceans of the **Belmont Forum**^[2] and the International Ocean Governance Communication^[3]. 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^[4], 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/GEOS**, 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^[5]. 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.

[A] 2019 - Blue Cloud services

Activities shall develop cloud services for applications that are specific for oceans, seas and fresh water bodies and are necessary for marine ecosystems research, conservation, forecasting and innovation in the Blue Economy, building and implementing also Blue Cloud demonstrators as needed. Blue Cloud demonstrators should integrate the Essential Ocean Variables^[6], notably the biological variables, including plankton biomass and diversity. They shall build on ongoing efforts (data, tools, EOSC, including its Pilot Blue Cloud, Data and Information Access Services (DIAS) of COPERNICUS, etc) and take account of the parallel EOSC thematic initiatives being developed – such as the Food Cloud Demonstrator.^[7] The action shall contribute to unlocking the innovation potential of the Blue Cloud, and demonstrate its potential in promoting the blue economy shortening the time span between research and innovation in frontier fields, such as micro-organisms and genomics-enabled innovations^[8]. Activities shall build on existing research infrastructures, take advantage of existing data sharing activities (for example EMODnet), and build on relevant results of past and on-going global, national and EU projects such as SeaDataCloud^[9], BlueBridge, the EOSC Pilot and other relevant projects funded under Horizon 2020, including those under Information and Communication Technologies^[10]. Proposals should include a task to cluster with other projects financed under this topic and – if possible – with other relevant projects in the field funded by Horizon 2020.

[B] 2019 - Observations and forecasting

The action shall contribute to the development and demonstration of the feasibility of the European component of a future Global Ocean Observing System in line with the G7 Tsukuba Communiqué^[11]. It will support activities in the different EU sea basins and the Atlantic Ocean, including the deep sea (below 2000 m), also supporting the needs of food security and safety as outlined in Food 2030^[12]. It will also support the future Collaborative Research Action on Oceans of the **Belmont Forum**^[13]. It will underpin forecasting of the state of the ocean, climate change impact and weather. Activities shall include the demonstration of methods and technologies and their integration in existing systems to collect information on the state and variability of European seas and the Atlantic Ocean, including the impact of stressors and marine litter, and underpin sustainable management of the marine environment and its resources (e.g. the effect of networks of protected areas and other spatial protection measures). They shall take account of the needs deriving from the G7 Future of the Seas and Oceans Initiative^[14], from actions such as the Atlantic Ocean Research Alliance and its related South Atlantic

Flagship, the BLUEMED Initiative, and notably common priorities with the WestMED Initiative^[15] and the EUSAIR^[16], and actions addressing other European regional seas. The inclusion of forecasting tools (for example to protect aquaculture installations or to inform fisheries decision making) shall be an advantage. Similarly, the sustainability of the approach selected, the integration of innovative observations solutions and existing systems, the smooth storage of data in open access data centres and the improvement of the predictive capability shall be demonstrated. Observations and data handling may also include pilots for Essential Ocean Variables (EOVs)^[6] under consideration (for example, nutrients, carbonate, sound and microbes/omics) and variables that are of importance in European regional seas as well as the integration of “augmented” observatories (i.e. genomic-enabled multidisciplinary observatories)^[17]. Flow of information across variables and disciplines shall be included. Data collected shall be in line with agreed standards, be openly available via portals (including EMODnet) and feed into the Pilot Blue Cloud (part of the European Open Science Cloud). International cooperation with Third Country partners is encouraged.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 6 million for sub-topic [A] and EUR 12 million for sub-topic [B] would allow this specific challenge to be adequately addressed. Nonetheless, this does not preclude the submission and selection of proposals requesting other amounts.

Proposals shall include a task to cluster with other projects financed under this topic and – if possible – with other relevant projects in the field funded by Horizon 2020. Possible links with related research and innovation activities supported by the **Belmont Forum**^[18] on Ocean sustainability shall also be considered.

[C] 2020 - Technologies for observations

Expected Impact: Contributing to the ongoing implementation of EU Policies such as the Bioeconomy Strategy, the Circular Economy Strategy, the European Open Science Cloud Initiative, the Blue Growth Strategy, the Common Fisheries Policy, the Maritime Spatial Planning Directive, the Marine Strategy Framework Directive, the International Ocean Governance Communication and the UN SDGs, activities shall:

In the short term:

- Support the implementation of the Future of the Oceans Initiative of the G7 Science Ministers.
- 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).
- 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 prevention, notably to protect aquaculture resources by 2020 (sub-topic B).

- 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) (sub-topic).

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 change, 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.

Delegation Exception Footnote: This topic is expected to continue in 2020.

Cross-cutting Priorities: Socio-economic science and humanities, International cooperation, Blue Growth

[1] <http://www8.cao.go.jp/cstp/english/others/20160517communique.pdf>

[2] **Belmont Forum** <https://www.belmontforum.org/>

[3] (JOIN(2016) 49)

[4] All proposals under B) must include an observation part.

[5] This will also include mutual feedback processes with the Copernicus Programme and other relevant actions such as those undertaken by IOC/IODE or the Marine Environment Monitoring Service.

[6] http://goosoocean.org/index.php?option=com_content&view=article&id=14&Itemid=114

[7] See topic DT-SFS-27-2019 under this Work Programme's SC2 Sustainable Food Security Call.

[8] Following up on the Communication "European Cloud Initiative – Building a competitive data and knowledge economy in Europe", the European Open Science Cloud (EOSC) will soon become an important tool for scientists, citizens and policy makers <https://ec.europa.eu/digital-single-market/en/news/communication-european-cloud-initiative-building-competitive-data-and-knowledge-economy-europe>

[9] This will also include mutual feedback process with the Copernicus Programme and other relevant actions such as those undertaken by IOC/IODE or the Marine Environment Monitoring Service.

[10] <https://ec.europa.eu/digital-single-market/en/information-communication-technologies-horizon-2020>

[11] <http://www.japan.go.jp/g7/userdata/common/data/20160517communique.pdf>

[12] European Research and Innovation for Food and Nutrition Security, SWD(2016)319. <http://ec.europa.eu/transparency/regdoc/rep/10102/2016/EN/SWD-2016-319-F1-EN-MAIN.PDF>

[13] <https://www.belmontforum.org/collaborative-research-actions>

[14] Recommendations 1, 3 and 4 on ocean observations and data sharing

[15] Initiative for the sustainable development of the blue economy in the Western Mediterranean

[16] <http://www.adriatic-ionian.eu/>

[17] The development of such laboratories is not part of this call.

[18] <https://www.belmontforum.org/>

Horizon 2020 Pillar:	Societal Challenges
Programme:	Health, demographic change and wellbeing
Call Title:	Better Health and care, economic growth and sustainable health systems
Call Identifier:	H2020-SC1-BHC-2018-2020
Topic Title:	Support for the functioning of the Global Research Collaboration for Infectious Disease Preparedness (GloPID-R)
Topic Identifier:	SC1-HCO-15-2019
Type of Action:	CSA Coordination and support action
Deadline(s):	16-04-2019 (single-stage)

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/sc1-hco-15-2019.html>

Specific Challenges: Human health worldwide is increasingly threatened by potential epidemics caused by existing or newly emerging infectious diseases, including those that are resistant to antimicrobial agents. With globalisation, people movement and trade at record highs, pathogens can spread further and faster than ever before in human history. To fight such an international challenge, the EU must think globally and coordinate with international infectious disease research funders.

It is for this reason that the **Global Research Collaboration for Infectious Disease Preparedness (GloPID-R)**^[1] was established in 2013 in response to a request for coordination by the Heads of International Research Organizations. Years on, **GloPID-R** now provides an important platform for infectious disease research funders to work together to better tackle deadly outbreaks such as Ebola, yellow fever, Zika and plague.

In order to save lives, a research response to an epidemic needs to be quick, flexible, comprehensive and global. For this reason, besides directly coordinating research to infectious disease outbreaks **GloPID-R** Members also work to improve the underlying international framework in which this research takes place. Ongoing efforts with the network include in-depth discussions on improved data-sharing during outbreaks, creating links between clinical trial networks, and the inclusion of social science into research responses to public health emergencies.

The above work, and more, requires a large amount of administrative support to **GloPID-R** Members. To maintain **GloPID-R**, facilitate its ongoing and new work

streams, and to increase the effectiveness of the network, further administrative and technical support in the form of a secretariat is warranted.

Scope: Proposals should provide administrative and organisational support to the Chair and Vice Chairs of **GloPID-R**, in close collaboration with the European Commission. This includes, but is not limited to, the organisation of meetings and teleconferences, including basic costs associated therewith as required; note-taking and record-keeping; management of information dissemination and communication between the Chairs, Members, Scientific Advisory Board (SAB), Industry Stakeholder Group (ISG), working groups, enquiries, and outside stakeholders. Proposals should also maintain and expand **GloPID-R**'s external communications activities, such as the website and newsletter, as requested by the Chairs.

Further to administrative and organisational issues, proposals should also provide more technical support on topics requested by the **GloPID-R** Chairs or groups such as the SAB or ISG. This may include preparing briefings, reports, mapping exercises or presentations. Furthermore, proposals shall take the lead in facilitating the work of the SAB, ISG and a number of **GloPID-R** working groups. For these reasons, proposals should have a familiarity with research preparedness and responses to infectious disease outbreaks, as well as the ability to facilitate and follow-up on discussions between high-level individuals in a professional manner.

Proposals should also provide a high level of adaptability. The **GloPID-R** secretariat primarily supports the work of the Chairs of **GloPID-R**, and should this work alter in scope or direction, remove or add work streams, or otherwise change the activities of the secretariat then it will be expected to have flexibility to change accordingly. In this regard, the selected consortium will be expected to submit an annual work plan to the Commission each year following the annual meeting of **GloPID-R**. This will take into account the conclusions of the annual meeting and will lay out an adapted plan for activities of the secretariat over the following 12 months as a result. Despite this, changes that alter the grant agreement will require approval by the Commission.

The Commission considers that proposals requesting a contribution from the EU of around 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. Funding may be complemented at a later date by additional funding from other members of **GloPID-R**.

Expected Impact:

- Effective operation of **GloPID-R** for at least three years.
- Reinforced international cooperation in funding of research in new and emerging infectious diseases, both between for-profit and not-for-profit research funders.
- Improved framework for a rapid and effective research response to prepare for or respond to public health emergencies, in areas such as data sharing, social science, clinical trial networks and others.

- Better communication of the activities of **GloPID-R** members, both as a group and individually, to the research community and other stakeholders.

Cross-cutting Priorities: International cooperation

^[1] **GloPID-R** website: <https://www.GloPID-R.org/>

Horizon 2020 Pillar: Societal Challenges

Programme: Secure, clean and efficient energy

Call Title: BUILDING A LOW-CARBON, CLIMATE RESILIENT FUTURE:
SECURE, CLEAN AND EFFICIENT ENERGY

Call Identifier: H2020-LC-SC3-2018-2019-2020

Topic Title: Research on advanced tools and technological development

Topic Identifier: LC-SC3-ES-6-2019

Type of Action: RIA Research and Innovation action

Deadline(s): 05-02-2019 (single-stage)

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/lc-sc3-es-6-2019.html>

Specific Challenges: A number of tools and future technologies need to be developed, matured and tested to cover gaps and/or to prepare the energy system of 2030 and beyond.

Scope: Proposals must address only one of the 4 following sub-topics whereby not necessarily all points listed in a sub-topic need to be addressed:

1. Advanced modelling tools for:
 - the modelling of the future electricity market to study and analyse the impact and the design of electricity pricing structure from the wholesale markets, to real time markets (balancing and congestion management) and retail markets;
 - modelling and forecasting energy production from variable renewables, associated frequency and voltage controls issues in the electricity grid and benefits associated with the use of storage.
2. Advanced tools for
 - the design and planning and operation of electricity grid infrastructure including distribution and transmission level, taking into account environmental concerns, such as air quality, and footprints and the new constraints from variable renewable generation, the place and role of storage and flexibility; the optimisation of the use of existing electricity assets and network capacity;
 - the development of grid predictive management strategies with uncertainty (forecasting plus stochastic grid management tools), improving the maintenance of electricity assets (distribution and transmission) as well as the associated data management;

- Enhanced TSO / DSO collaboration and coordination tools, secure data exchange across networks along whole the value chain, ICT tools for cross-border trading for nearly real-time balancing; definition of minimum set of specifications to allow automated digital cross-border electricity market.
 - Enabling technologies for reliable and resilient interconnected European electricity grids, making use of the specific features and the strategic role of the European Global Navigation Satellite Systems Galileo and EGNOS.
3. Technological developments:
- Develop a new generation of reliable, robust and cost-effective energy storage technologies, storage management systems, in particular batteries, able to provide high specific energy rates, large number of life cycles, fast response to the electrical network demands and low maintenance;
 - Power electronics for batteries and software to manage combined or hybridised decentralised energy systems, also combining several energy vectors: a key focus is on significant cost reduction of these key components for homes, districts and larger systems which have the potential to accelerate significantly the energy transition of the electricity network.
4. International Cooperation with non-EU/Associated country member of **Mission Innovation**^[1] on **Mission Innovation** Challenge 7 on Affordable Heating and Cooling for Buildings:
- Develop compact thermal energy storage for electricity load shifting that will take up electricity from the grid at the peak times, to be used for heating, cooling or hot tap water at later times. Typical required charging power is 3 kW, for periods of up to three hours. Integration into the building heating system and in the smart electricity grid is a key development element together to the storage materials and technologies.

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

Proposal must clearly indicate which sub-topic 1, 2, 3 or 4 they are targeting.

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.

Expected Impact:

1. Advanced modelling tools are expected to: increase the knowledge on how to design of price structure and magnitude in order to be able to finance e.g. infrastructure and research and innovation; enhance the accuracy of the prediction of electricity production from variable renewables and better qualify and quantify associated issues and remedies
2. Advanced tools are expected to develop new approaches to electricity grid planning, monitoring and maintenance that are better suited to today's future characteristics of the grid and enable savings on infrastructure costs.

3. The technological developments are expected to reduce costs of key technology components to allow European Industry to keep and extend its leadership in power electronics for stationary battery systems of all sizes (from home to utility scale) and the integration of battery systems with high shares of renewable electricity and eventually also heating and cooling.
4. Contribute to the objectives of **Mission Innovation** and provide efficient innovative small scale power to heat/cool flexibility measures that can be deployed in a large number of buildings so as to enable the grid to operate with large share of variable renewable energy

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.

Cross-cutting Priorities: International cooperation, Clean Energy

^[1] Australia, **Brazil**, Canada, Chile, People's Republic of China, India, Indonesia, Japan, Mexico, Republic of Korea, Saudi Arabia, United Arab Emirates, United States

Horizon 2020 Pillar: Societal Challenges

Programme: Secure, clean and efficient energy

Call Title: BUILDING A LOW-CARBON, CLIMATE RESILIENT FUTURE: SECURE, CLEAN AND EFFICIENT ENERGY

Call Identifier: H2020-LC-SC3-2018-2019-2020

Topic Title: Low carbon industrial production using CCUS

Topic Identifier: LC-SC3-NZE-5-2019-2020

Type of Action: IA Innovation action

Deadline(s): 27-08-2019 (single-stage)

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/lc-sc3-nze-5-2019-2020.html>

Specific Challenges: CCUS in industrial applications faces significant challenges due to its high cost and the fierce international competition in the sectors concerned. However, these sectors currently account for 20% of global CO₂ emissions, and in the 2 degree scenario, should represent half of the stored CO₂ by 2050. Relevant sectors with high CO₂ emissions are for example steel, iron and cement making, oil refining, gas processing, hydrogen production, biofuel production and waste incineration plants.

Scope: Projects will focus on integrating CO₂ capture in industrial installations, whilst addressing the full CCUS chain. Projects will elaborate a detailed plan on how to use the results, i.e. the subsequent transport, utilisation and/or underground storage of the captured CO₂. Important aspects to address are of technical (e.g. the optimised integration of capture plant with industrial processes; scalability; CO₂ purity), safety (e.g. during transportation and storage), financial (e.g. cost of capture; cost of integration) and strategic nature (e.g. business models; operation and logistics of industrial clusters and networks).

Projects are expected to bring technologies to TRL 6-7 (please see part G of the General Annexes). Technology development has to be balanced by an assessment of the societal readiness towards the proposed innovations. Relevant end users and societal stakeholders will be identified in the proposal, and their concerns and needs will be analysed during the project using appropriate techniques and methods from the social sciences and humanities, in order to create awareness, gain feedback on societal impact and advancing society's readiness for the proposed solutions. Projects should also explore the socio-economic and political barriers to acceptance and awareness with a view to regulatory or policy initiatives.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 10 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.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged, in particular with relevant **Mission Innovation**^[1] countries such as China^[2].

Expected Impact: Successful, safe and economic demonstration of integrated-chain CCUS from relevant industrial sources such as mentioned in the specific challenge will accelerate the learning, drive down the cost and thus help break the link between economic growth and the demand for industrial output on one hand, and increasing CO2 emissions on the other hand. The impact of projects under this call will to a large extent be determined by the extent to which the results will be exploited, i.e. the plan on how the captured CO2 will be actually utilised and/or stored, either in the project or planned as a future phase. This will be evaluated based on the maturity and quality of the proposed post-capture solutions. Projects under this call that are carried out in areas where there is both a high concentration of CO2 emitting industries and a nearby capacity for geological storage are considered prime sites for hub and cluster developments, and will generate the highest impact on full-scale deployment in the medium to longer term.

Delegation Exception Footnote: It is expected that this topic will continue in 2020.

Cross-cutting Priorities: Socio-economic science and humanities, RRI, International cooperation, Open Innovation

^[1] <http://mission-innovation.net/our-work/innovation-challenges/>

^[2] A Co-funding mechanism is in place in China; see <https://ec.europa.eu/programmes/horizon2020/en/news/eu-china-research-and-innovation-co-funding-mechanism-first-call-launched-china>

Horizon 2020 Pillar: Societal Challenges

Programme: Secure, clean and efficient energy

Call Title: BUILDING A LOW-CARBON, CLIMATE RESILIENT FUTURE: SECURE, CLEAN AND EFFICIENT ENERGY

Call Identifier: H2020-LC-SC3-2018-2019-2020

Topic Title: Converting Sunlight to storable chemical energy

Topic Identifier: LC-SC3-RES-29-2019

Type of Action: RIA Research and Innovation action

Deadline(s): 27-08-2019 (single-stage)

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/lc-sc3-res-29-2019.html>

Specific Challenges: To replace fossil energy with sustainable alternatives that provide the same flexibility and convenience of use, we need to store sustainable energy on a large scale and for a long time in new kind of energy storage compounds. This can be done by direct conversion of sunlight into storable chemicals that can be stored for a virtually unlimited time. At present, these processes can be performed at the level of small prototype devices at high cost. Therefore, research and innovation are needed to bring these approaches from infancy to maturity. The production of clean forms of storable chemical energy from direct sunlight is the next step.

Performance breakthroughs, including day and night continuous processes, and cost reductions are a must in order to unlock the potential of technologies converting sunlight to storable chemical energy.

This challenge is fully aligned to the "Converting Sunlight Innovation Challenge"^[1] identified as a priority in **Mission Innovation**.

Scope: Proposals are expected to address renewable energy technologies that will answer the challenge described in the "Converting Sunlight Innovation Challenge" of **Mission Innovation**, bringing them up to TRL 4 or 5. Beside the technological development, the proposal will have to clearly address the following related aspects: the potential lower environmental impact than the current technologies, possibly through a LCA analysis, the better resource efficiency, issues related to social acceptance or resistance to new energy technologies, related socioeconomic and livelihood issues, and prospective market analysis. The proposal needs to consider all three dimensions of sustainability, resource efficiency and scalability, i.e. not using materials which

are uncommon, dangerous or scarce that could disable its future concept to be used at large scale.

At least one of the following technology-specific challenges has to be addressed:

- Improved light-harvesting and efficient charge separation in photocatalytic systems;
- Photoelectrochemical cells – PECs and catalyst development;
- Thermochemical pathways to energy rich chemicals (using concentrated solar light); and
- Design and engineering of devices, systems or prototypes integrating together the different processes, with day and night control and applicability for the production of chemical energy rich carriers.

The area of electrolyzers efficiently utilizing a renewable electricity input, such as provided by photovoltaics, wind turbines or other sustainable means, is not covered by this challenge.

The proposal must have a plausible pathway to scale the technology to the terawatt scale by 2050, a plausible potential for an EROI > 10 (EROI: Energy returned on energy invested) and the full recyclability of the conversion devices in the context of a circular economy must be ensured.

As part of **Mission Innovation** actions, the project will be required to contribute towards the activities of the "Converting Sunlight Innovation Challenge". Beside solving the technical challenge, the consortium is expected to budget the participation in the development of the Challenge work plan through activities such as dissemination, exchange of researcher and networking as well as through contributing in official meetings.

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

Expected Impact: Projects will not only contribute to mitigating climate change through the production of storable chemical energy from the sun, but also enhance energy security and provide opportunities for economic development across the globe.

Projects should show its contribution towards establishing a solid European innovation base and building a sustainable renewable energy system.

Contributing to **Mission Innovation** aims, projects will deepen the international collaboration in clean energy research and development.

Delegation Exception Footnote: It is expected that this topic will continue in 2020.

Cross-cutting Priorities: International cooperation, Clean Energy, Socio-economic science and humanities

^[1] <http://mission-innovation.net/our-work/innovation-challenges/converting-sunlight-challenge/>

Horizon 2020 Pillar:	Societal Challenges
Programme:	Secure, clean and efficient energy
Call Title:	BUILDING A LOW-CARBON, CLIMATE RESILIENT FUTURE: SECURE, CLEAN AND EFFICIENT ENERGY
Call Identifier:	H2020-LC-SC3-2018-2019-2020
Topic Title:	Developing the next generation of renewable energy technologies
Topic Identifier:	LC-SC3-RES-1-2019-2020
Type of Action:	RIA Research and Innovation action
Deadline(s):	16-10-2018, 25-04-2019 (two-stage)

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/lc-sc3-res-1-2019-2020.html>

Specific Challenges: The renewable energy technologies that will form the backbone of the energy system by 2030 and 2050 are still at an early stage of development today. Bringing these new energy conversion solutions, new renewable energy concepts and innovative renewable energy uses faster to commercialisation, taking into account social acceptance and secure and affordable energy supply, is challenging. These new technologies must not only have a commercial potential but they should also have a lower environmental impact and lower greenhouse gases emissions than the current renewable energy technologies.

Due to the pre-competitive nature of the research activities of this type, particular emphasis is put on including international cooperation opportunities, whenever relevant to the proposal and the domain, in particular in the context of the **Mission Innovation** Challenges^[1].

Scope: Proposals are expected to bring to TRL 3 or TRL 4 (please see part G of the General Annexes) renewable energy technologies that will answer the challenge described. Beside the development of the technology, the proposal will have to clearly address the following related aspects: the potential lower environmental and climate impact on a life cycle basis, the better resource efficiency, issues related to social acceptance or resistance to new energy technologies, related socioeconomic and livelihood issues.

Support will be given to activities which focus on converting renewable energy sources into an energy vector, or the direct application of renewable energy sources.

One of the following technology-specific sub-topics has to be addressed:

- Developing the new energy technologies that will form the backbone of the energy system by 2030 and 2050. The challenge is to develop energy technologies currently in the early phases of research. It is crucial that these new, more efficient, and cost-competitive energy generation and conversion technologies, demonstrate their potential value in the future European energy system. Developments in sectors other than energy may provide ideas, experiences, technology contributions, knowledge, new approaches, innovative materials and skills that are of relevance to the energy sector. Cross-fertilisation could offer mutually beneficial effects;
- Innovative materials for geothermal heat exchangers to maximize energy transfer and improve the overall conversion efficiency of a geothermal system;
- Innovative testing methods and design tools for acceleration of wind energy technology development and increased life time extension;
- Sustainable fuels other than hydrogen for energy and transport application through ground-breaking conversion technologies, addressing for example development of novel microorganisms, enzymes, catalysts, photosensitizers and separation techniques, improvement of biomass and microalgae yields, and development of novel technologies of combined indirect and direct artificial photosynthesis with chemical/ biochemical/biological systems;
- Innovative very high efficiency thin-film photovoltaics concepts considering advanced, sustainable and low-cost materials and processes.

Novel technology solutions for grid integration, storage, fuel cells and hydrogen – (other than integral to the technology solution developed), energy efficiency and smart cities will not be supported under this topic but in the relevant parts of this work programme part and other H2020 work programme parts.

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 to 5 million would allow this challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: On its completion, the project is expected to advance the knowledge and prove the technological feasibility of the concept including the environmental, social and economic benefits. The proposal should show its contribution towards establishing a solid European innovation base and building a sustainable renewable energy system contributing to the decarbonisation of our economies. The proposed solutions are expected to contribute to strengthening the EU leadership on renewables.

Delegation Exception Footnote: It is expected that this topic will continue in 2020.

Cross-cutting Priorities: Blue Growth, Clean Energy, International cooperation, Socio-economic science and humanities

^[1] <http://mission-innovation.net/our-work/innovation-challenges/>

Horizon 2020 Pillar: Societal Challenges

Programme: Secure, clean and efficient energy

Call Title: BUILDING A LOW-CARBON, CLIMATE RESILIENT FUTURE: SECURE, CLEAN AND EFFICIENT ENERGY

Call Identifier: H2020-LC-SC3-2018-2019-2020

Topic Title: Market Uptake support

Topic Identifier: LC-SC3-RES-28-2018-2019-2020

Type of Action: CSA Coordination and support action

Deadline(s): 11-12-2018 (single-stage)

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/lc-sc3-res-28-2018-2019-2020.html>

Specific Challenges: 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. The "Clean Energy for all Europeans" package adopted at the end of 2016 introduces further targets towards 2030 and introduces modifications in the energy market design that will empower individuals or communities to participate actively to the energy system transformation. Renewable energy technologies have the opportunity to play a crucial role in this transition, leading to an increased share of renewable energy consumed in the EU and to a more active role for the consumers. However, introducing and deploying at large scale new and improved technologies entails a number of challenges, notably as regards their initial high cost, the consumer acceptance and the legal and financial barriers arising from bringing novel solutions to a technical environment with already reliable solutions in place.

Scope: The proposal will develop solutions which can be easily implemented for overcoming barriers to the broad deployment of renewable energy solutions. In particular, the proposal will address one or more of the following issues:

- Recommendation for harmonisation of regulations, life cycle assessment approaches, environmental impact methodologies of renewable energy solutions;
- Development of additional features for RES to be compliant with the electricity market requirements, making them "market fit", such as developing the possibility to provide additional services to the grid such as peak power and having an active role in electricity balancing/reserve market;

- Support sharing of best practice between public funding bodies for the cross-border participation in RES electricity support schemes, increasing the use of the "RES co-operation mechanisms" foreseen in the legislation;
- Development of insurance schemes to be available to developers in Europe and worldwide to mitigate risks, such as in geothermal drilling and offshore installation;
- Development of innovative financing mechanisms, schemes and sharing of best practices for cost-effective support for uptake of renewable sources, such as through the use of Public Procurement of Innovative Solutions instrument or smartly designed tenders;
- Development of support tools to facilitate export markets, especially for technologies where export market potential is much higher than internal market e.g. for hydropower. The focus will be on capacity building for market activities in developing and **Emerging Countries**, including identifying research needs, within the objectives of developing country- specific technologies and solutions, and/or adapting existing ones, taking into account local aspects of social, economic and environmental sustainability. Participation of developing and **Emerging Countries** is encouraged, in particular if these countries have identified energy as a priority area for their development and whenever common interest and mutual benefits are clearly identified.
- Development of tools (methods and models) for environmental impact assessments of renewable energy projects;
- Development of tools or services using global earth observation data, (such as those available through COPERNICUS), to support development and deployment of renewable energy sources;
- Determining conditions and defining options for retrofitting existing energy and industrial installations (first generation biofuels, pulp and paper, fossil refineries, fossil firing power and Combined Heat and Power (CHP) plants) for the complete or partial integration of bioenergy, with concrete proposals for such retrofitting for the different cases of bioethanol, biodiesel, bio-kerosene, intermediate bioenergy carriers and other advanced biofuels and renewable fuels and biomass based heat and power generation, on the basis of the assessment of the capital expenditure (CAPEX) reduction and market benefit;
- Development of optimisation strategies regarding cost, energy-performance and LCA for bioenergy and sustainable renewable fuels in upgraded energy and industrial installations;
- Development of cost-effective logistics, feedstock mobilisation strategies and trade-centres for intermediate bioenergy carriers.

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 calls for multi-disciplinary research designs, which should include contributions also from the social sciences and humanities. Where relevant, regional specificities, socio-economic, spatial and environmental aspects from a life-cycle perspective will be considered. Where relevant, proposals are expected to also critically evaluate the legal, institutional and political frameworks at local,

national and European level and how, why and under what conditions these (could) act as a barrier or an enabling element.

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 contribute to:

- Facilitate the introduction of these technologies and increase the share of renewable energy in the final energy consumption;
- Lead to substantial and measurable reductions for project developments, whilst still fully addressing the needs for environmental impact assessments and public engagement;
- Develop 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.

Delegation Exception Footnote: It is expected that this topic will continue in 2020.

Cross-cutting Priorities: Clean Energy, Open Innovation, International cooperation, RRI, Socio-economic science and humanities

Horizon 2020 Pillar:	Societal Challenges
Programme:	Smart, green and integrated transport
Call Title:	2018-2020 Mobility for Growth
Call Identifier:	H2020-MG-2018-2019-2020
Topic Title:	InCo Flagship on Integrated multimodal, low-emission freight transport systems and logistics
Topic Identifier:	MG-2-9-2019
Type of Action:	RIA Research and Innovation action
Deadline(s):	16-01-2019, 12-09-2019 (two-stage)

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/mg-2-9-2019.html>

Specific Challenges: Global as well as regional and local freight transport is massively changing due to accelerating technological changes, the establishment of new players in global trade, the rise of protectionism, and the slowing down of economic growth of important partners such as China. New logistics concepts (such as the Physical Internet) and new disruptive technologies, such as Blockchain, Industry 4.0, vehicle automation and truck platooning or new business models, like 'crowdshipping' and the circular economy models will have an impact on global freight transport, its optimisation and its environmental footprint that needs to be better understood and assessed. Furthermore new trade routes from and to Europe will probably change the traditional pattern of freight movement and will need new connections with European corridors and hubs at a time of budget limitation on investment for transport infrastructure.

Sustainable integrated multimodal freight transport is particularly important for the development of countries in special situations – least developed countries, landlocked developing countries, and small island states and outermost regions - which face common problems resulting from the under-resourcing of transport infrastructure and services, traffic-related air pollution and high accident levels, but also diverse geopolitical and trade situations. These countries/regions also have an enormous potential for sustainable development. International cooperation can support their economies both domestically and globally for a global benefit and ensuring better integration of these regions into the world economic landscape.

Scope:

Proposals should address one or more of the following aspects:

- Understanding how new concepts in logistics, in combination with new national strategies to organize freight flows in ports and airports have an impact on global freight transport, and on related greenhouse gas emissions. Multimodal transfer zones from ports and airports from long-haul to last mile logistics need to be better analysed in order to find appropriate measures and for ensuring seamless door-to-door transport, exploiting the full potential of modularization and other innovative logistics concepts. International cooperation with major trade partner countries is essential to ensure the smooth transfer at all levels of the transport chain. Proposals should also address solutions that enable peripheral regions and landlocked developing countries to have proper accessibility to international trade.
- Speed up the process and transition towards the Physical Internet paradigm, demonstrating how different technologies, business cases and standards come together in real-world applications, and are able to deliver added value to the users and have positive impacts in terms of emissions and energy consumption. Priority partners should be USA, Canada, China, Japan. Demonstrations of satellite-based applications using EGNOS and Galileo are also suggested.
- Research the range of new issues and questions emerging with the new trade routes to and from Europe, such as the Northern Sea Route (across an ice-free Arctic in summer months) or the new Silk Road routes and the Chinese One Belt One Road strategy; the effect of the development of these new routes on trans-continental freight modal split; the additional interfaces needed between the new overland routes and the EU internal transport networks / corridors. Priority partners are those along the routes. The geopolitical and trade aspects of these developments, in particular on countries affected by these developments, should be considered.
- Understand new disruptive trends emerging as on-demand logistics solutions such as crowd-sourcing of deliveries (or 'crowdshipping') which have the potential to be a logistics 'game-changer', evidencing different impacts in both emerging and industrialized countries, including the possible integration of passengers and freight flows. Research on the crowd-sourcing of logistics would benefit from international collaboration, partly to compare the development of the phenomenon in different markets, but also to explore whether it can be extended to long-haul / cross border freight delivery, taking in consideration economic, regulatory and security constraints.
- Assess the impact of emerging technologies in other sectors than freight transport (e.g. Blockchain, Industry 4.0, 5G, 3D printing, unmanned aerial vehicles (UAV's)) on the logistics operational system, and identify the potential development paths that lead to the optimal exploitation of their positive effect.
- Collect best case models and develop decision support systems aimed at helping public authorities and private companies to determine the most likely scenarios and to promote a higher level of collaboration between the different stakeholders, including new emerging ones.

- Consideration of aspects of governance, privacy and cybersecurity of and with regard to cargo.

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

In line with the Union's strategy for international cooperation in research and innovation^[1], international cooperation is encouraged. In particular proposals should consider cooperation with projects or partners from the US, Japan, Canada, China, **Latin America**.

In particular, proposals should foresee twinning with entities participating in projects funded by US DOT to exchange knowledge and experience and exploit synergies.

Expected Impact: Main impact from the R&I activities should be the improved integration of the European transport network (both hard – TEN-T – and soft – logistics and IT) with the global network, through the sustainable development of the transport nodes likely to benefit from the emergence of new trade routes and harmonised platforms and new and revised 'nodes', also in support of the sustainable development of new logistics routes and their link with national/regional markets. Better understanding of the impact of emerging technologies on freight flow and subsequent guidelines to optimize vehicle, infrastructure and operation accordingly. Facilitate the development of disadvantaged regions and their inclusion into the international trading system. Better understanding of links between technological development, trade and geopolitics. Research should be validated in a selected number of case studies through pilot demonstration, trials and testing involving service providers and end-users.

Cross-cutting Priorities: International cooperation

^[1] (COM(2012)497)

Horizon 2020 Pillar:	Societal Challenges
Programme:	Smart, green and integrated transport
Call Title:	Building a low-carbon, climate resilient future: Green Vehicles
Call Identifier:	H2020-LC-GV-2018-2019-2020
Topic Title:	InCo flagship on “Urban mobility and sustainable electrification in large urban areas in developing and emerging economies”
Topic Identifier:	LC-GV-05-2019
Type of Action:	IA Innovation action
Deadline(s):	25-04-2019 (single-stage)

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/lc-gv-05-2019.html>

Specific Challenges: Climate change, energy security and local air pollution are some of the key questions for the 21st century. Urban areas in developing and **Emerging Countries** are major driving factors in growing global energy demand and Greenhouse Gas emissions.

Although cities cover only 2% of the earth's surface, 50% of the world's population lives in cities, but they are responsible for three-quarters of the global energy consumption as well as approximately 80% of the global greenhouse gas emissions. While the trend towards urbanisation and the associated increase of personal and freight transport creates massive challenges, in particular in developing and emerging economies, it also offers the unique opportunity to shape energy use especially in the transport and urban form towards a low carbon pathway. Moving towards sustainable mobility will also help addressing urban congestion, access to jobs and public services, and local air pollution.

This is why urbanisation requires integrated mobility solutions that bring together technology opportunities with local and national policy, including land use and mobility planning. Efficient transport and mobility, based on a balanced mix of public and private transport and dependent on the characteristics of each city, is and will continue to be the backbone of cities' growth and competitiveness.

Whereas environmental issues are very high on urban mobility agendas, the importance of transport in urban social and economic structures is often neglected in discussions. All three aspects of urban sustainability must be treated with equal importance and have to be examined in parallel.

Scope: Actions should bring together European, Asian (e.g. China), **CELAC** (Community of Latin American and Caribbean States) and African research partners, government agencies and urban authorities, private sector and civil society with relevant expertise and competence within the corresponding cooperation framework and foster participatory engagement in urban electrification in order to reduce air pollution and CO2 emissions. All types of vehicle are considered under this topic (powered 2 wheelers, cars, buses, trucks and LDV).

Proposals should address all of the following activities:

- Development of a toolbox for advanced management strategies towards a more efficient private and public electric mobility: E-mobility management strategies, focusing on smart deployment and operation of vehicles, in particular electrified vehicle, to increase mobility and energy efficiency, emission reduction and user acceptance of electrified vehicles
 - A smart and cooperative management of the vehicle in urban operation, (intermodal route planning, ecorouting eco-driving charging and parking infrastructure availability...).
 - Deployment and operation of infrastructure use charging infrastructure (conventional and wireless) and network, availability of parking places. Adaptation and integration of existing/ adapted vehicles of different types if necessary.
 - Efficient integration of the operations of different electrified road public transport, from e-bike to bus rapid transit (e- BRT) including mini-buses, taxi and mobility services on demand through smart navigation and routing, coordinated traffic management, demand-responsive service and dispatching
- Comparative demonstrations activities and pilots in cities will include at least one demonstrator in the following regions: Europe, Asia, Africa and **CELAC** (leading to a minimum of 4 city demonstrators). Demonstrations will involve local partners. Innovative concepts for electrified road public transport (passenger and freight), jointly designed through International Partnerships as a contribution to a wider sustainable mobility concept, from the perspective of a seamless mobility, taking in account the acceptance of users (travellers or freight operator).
- Implementation concepts to scale up the demonstration activities. Evaluation of the relative outputs and accordingly the development of implementation concepts to scale up the demonstration activities and exploration of the sustainable mobility planning in the city transformation process :
 - Sustainable planning of city and transportation infrastructure: link city planning with policy discussion and implementation solutions and city goals and with any Air Quality Plans
 - Dedicated plans for financing solutions, including public and private operations.
 - Regional and international replication conditions to reach out to a larger number of cities and countries

Cooperation and synergies with ongoing activities undertaken with international initiatives such as Decarbonising Transport (International Transport Forum) and

the Urban Electric Mobility Initiative (UN-Habitat) and other joint initiatives of European Member States international cooperation initiatives and the European Commission (e.g. Mobilise Your City) should be sought where appropriate.

In line with the strategy for EU international cooperation in research and innovation^[1], international cooperation is encouraged.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 15 and 18 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 contribute to:

- Capability to quantify the potential reduction of greenhouse gas and pollutant emissions as well as traffic congestion, by demonstrating improvements that can be achieved with new urban mobility systems and electrification, for each stakeholder in the value chain (in line with the objectives set by the COP21 and the New Urban Agenda)
- UN's Sustainable Development Goals 11 "Sustainable cities and communities" and 13 "Climate Action"
- Reference models of the mobility system to provide a basis in order to assess the ability to replicate sustainable concepts by demonstrating the short- and long-term benefit for the stakeholders involved, and especially considering the relevant boundary conditions (i.e infrastructure, vehicle, usage needs and patterns, governance, financing schemes, urban organisation, etc) and how the result contributes to key EU policy goals (including climate goals and competitiveness of European industry)
- A basis for strengthening the collaboration of the European Union with Asia (e.g. China, India, etc), **Latin America (CELAC)** and Africa, which also offers both a common starting point for common future legislative efforts, as well a favourable setting for new business opportunities for innovative local and European entrepreneurs.

Cross-cutting Priorities: Open Innovation, Clean Energy, Contractual Public-Private Partnerships (cPPPs), EGVI, RRI, Socio-economic science and humanities, International cooperation

^[1] (COM (2012) 497)

Horizon 2020 Pillar:	Societal Challenges
Programme:	Smart, green and integrated transport
Call Title:	2018-2020 Mobility for Growth
Call Identifier:	H2020-MG-2018-2019-2020
Topic Title:	Supporting Joint Actions on sustainable urban accessibility and connectivity
Topic Identifier:	MG-4-6-2019
Type of Action:	ERA-NET-Cofund ERA-NET Cofund
Deadline(s):	25-04-2019 (single-stage)

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/mg-4-6-2019.html>

Specific Challenges: The proposed ERA-NET Cofund action addresses specific challenges of sustainable urban accessibility and connectivity. Sustainable urban accessibility and connectivity is defined as the ease with which activities and opportunities may be reached in an urban transport system, with lower negative environmental impacts. Network connectivity reflects the directness of routes, using different modes to travel between points. It applies both for passenger and freight transport.

Providing accessibility and connectivity can boost economic and societal development, which is supported by much of the EU, national, regional and local transport policy (infrastructure investments, providing public transport).

Despite the high transport network densities in urban areas, there are still accessibility and connectivity challenges, sometimes specifically for various socio-economic groups. Some forms of mobility (especially road-based) raise issues with respect to local environment and space utilisation, encouraging policies aiming to reduce car-use but possibly affecting mobility for specific user groups. The interaction is complex and not always well understood.

Scope: The projects funded by the ERA-NET Cofund action especially address the potential impact and possibilities for deployment of new mobility services and initiatives by analysing behavioural responses and estimating effects on the various aspects of sustainability (i.e. the environment, economic development and people's well-being), for both passenger and freight transport.

Proposals should pool the necessary financial resources from the participating national (or regional) research programs with a view to implementing a joint call for proposals resulting in grants to third parties with EU co-funding in this area.

Participation of legal entities from third countries, and/or regions, including those not automatically eligible for funding in accordance with General Annex A is encouraged in the joint call as well as in other joint activities including additional joint calls without EU co-funding. Participants from countries not listed in General Annex A are eligible for EU funding under this topic and may request a Union contribution (on the basis of the ERA-NET unit cost) only for the coordination costs of additional activities.

The aim of this ERA-NET Cofund is to launch a joint research and innovation call for proposals. The funded proposals should specifically address the interaction between socio-economic development and accessibility and connectivity with regards to any of the following topics and combinations of these topics:

- Main reasons and drivers behind mobility behaviour (i.e. responses to new technologies and policies), taking into account various types of actors, and the intricate behavioural interactions;
- Potential solutions (technological, social, economic, etc.) to increase accessibility and connectivity in low density areas and for disadvantaged groups in urban areas;
- Potential variables supporting a shift towards more sustainable mobility behaviour to more sustainable modes (particularly 'soft'/'slow'/'active' modes) and alternatives for personal mobility. Possible behavioural rebound and compensational effects should be taken into account;
- Possible contribution of improving accessibility and connectivity to socio-economic development in urban areas that are typically defined by their spatial concentration and proximity.
- Assessment of the most effective strategies for improving connectivity, intermodality and systems integration in urban areas.
- Assessment of how innovative mobility concepts and services developments could benefit or affect specific groups in urban areas, and possible consequences for them.

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. Also, synergies should be achieved with other actions funded by Horizon2020, activities by the CIVITAS initiatives, the European Innovation Partnership in Smart Cities and communities and the EU Urban Agenda.

The project deliverables (e.g. surveys, user/ IT platforms, modelling tools, Apps and other project deliverables) generated by the Co-funded Action projects and the projects from the non-Co-funded Action need to be collected and curated at the programme level so that these can be readily used in future R&D projects. Therefore, the proposal should provide how (by clear tasks and deliverables) this will be carried out by the consortium.

In addition, the proposal should demonstrate and implement at programme level how the results from the Co-funded Action projects and the projects from the non-Co-funded Action will be collected and transferred to existing European urban mobility actions, notably the ELTIS database (e.g. all city case studies) and dissemination actions of the CIVITAS and European Innovation Partnership in Smart cities and communities.

A strong involvement of local, regional or national transport organisations (that are for example operators, managers or transport planners) is highly encouraged for all Co-funded Action projects and the projects from the non-Co-funded Action. This involvement will maximise the impacts of the project results on European, national, regional and local urban mobility policies, as well as to ensure dissemination of results and alignment of policies.

The proposal should provide a clear strategy about how existing initiatives, notably expert groups linked to CIVITAS (support action), will be involved in prioritising funding topics and in providing dissemination of project results.

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: The ERA-NET Co-fund action will bring about effective trans-national, pan-European research networking and synergies among national/regional and EU research programmes in sustainable urban accessibility and connectivity and in increasing the evidence base for urban mobility policies at local, regional, national and European level, as well as global level through the involvement of Chinese organisations.

The ERA-NET Co-fund action should lead to a considerable number of funded projects in the above fields. The results of the funded projects are expected to make a clear contribution to the attainment of EU Transport Policy objectives (including TEN-T) and to strengthen the competitiveness of the EU transport sector.

This shall be achieved by delivering a set instruments, approaches and tools (notably SUMP^[1] and SULP^[2]) that can help cities, citizens, communities, businesses and institutions (including in less-developed parts of the EU) to use new developments to their full potential and to limit their possible adverse effects in urban mobility. Relevant impacts can be extended to peri-urban and rural-urban mobility flows.

In addition, this ERA-NET is expected to influence national strategies, build critical mass and lead to greater alignment of national policies in participating states, in particularly urban mobility, research and innovation in urban mobility.

Cross-cutting Priorities: Socio-economic science and humanities, International cooperation, ERA-NET, RRI

^[1] Sustainable Urban Mobility Plan

^[2] Sustainable Urban Logistics Plan