



International Cooperation in Horizon 2020

EU and China

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| Societal Challenges | Fehler! Textmarke nicht definiert. |

In addition to the topics mentioned herein the European Commission flagged the following calling topics (listed on page 20 in the [Roadmap for EU-China S&T cooperation](#)) as being particularly and thematically suitable for international STI cooperation with China.

Excellent Science

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| Horizon 2020 Pillar: | Excellent Science |
| Programme: | European research infrastructures (including e-Infrastructures) |
| Call Title: | Integrating and opening research infrastructures of European interest |
| Call Identifier: | h2020-infraia-2018-2020 |
| Topic Title: | Integrating Activities for Advanced Communities |
| Topic Identifier: | INFRAIA-01-2018-2019 |
| Type of Action: | RIA Research and Innovation action |
| Deadline(s): | 22-03-2018 (single-stage) |

Participant Portal Weblink:

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

Specific Challenges: European researchers need effective and convenient access to the best research infrastructures in order to conduct research for the advancement of knowledge and technology. The aim of this action is to bring together, integrate on European scale, and open up key national and regional research infrastructures to all European researchers, from both academia and industry, ensuring their optimal use and joint development.

Scope: 'Advanced Communities' are scientific communities whose research infrastructures show an advanced degree of coordination and networking at present, attained, in particular, through Integrating Activities awarded under FP7 or previous Horizon 2020 calls.

An Integrating Activity will mobilise a comprehensive consortium of several key research infrastructures in a given field as well as other stakeholders (e.g. public authorities, technological partners, research institutions) from different Member States, Associated Countries and other **third countries**^[1] when appropriate, in particular when they offer complementary or more advanced services than those available in Europe.

Funding will be provided to support, in particular, the trans-national and virtual access provided to European researchers (and to researchers from **Third countries** under certain conditions^[2]), the cooperation between research infrastructures, scientific communities, industry and other stakeholders, the improvement of the services the infrastructures provide, the harmonisation, optimisation and improvement of access procedures and

interfaces. Proposals should adopt the guidelines and principles of the European Charter for Access to Research Infrastructures.

To this extent, an Integrating Activity shall combine, in a closely co-ordinated manner:

- i. Networking activities, to foster a culture of co-operation between research infrastructures, scientific communities, industries and other stakeholders as appropriate, and to help develop a more efficient and attractive European Research Area;
- ii. Trans-national access or virtual access activities, to support scientific communities in their access to the identified key research infrastructures;
- iii. Joint research activities, to improve, in quality and/or quantity, the integrated services provided at European level by the infrastructures.

All three categories of activities are mandatory as synergistic effects are expected from these different components.

Access should be provided only to key research infrastructures of European interest, i.e., those infrastructures able to attract significant numbers of users from countries other than the country where they are located. Other national and regional infrastructures in Europe can be involved, in particular in the networking activities, for the exchange of best practices, without necessarily being beneficiaries in the proposal.

Proposals from advanced communities will have to clearly demonstrate the added value and the progress beyond current achievements in terms of integration and services, of a new grant. The strongest impact for advanced communities is expected typically to arise from focusing on innovation aspects and widening trans-national and virtual access provision, both in terms of wider and more advanced offer of scientific services, than in terms of number of users and domains served. Furthermore, in particular for communities supported in the past under three or more integrating activities, the creation of strategic roadmaps for future research infrastructure developments as well as the long-term sustainability of the integrated research infrastructure services provided at European level, need to be properly addressed. The latter requires the preparation of a sustainability plan beyond the grant lifecycle as well as, where appropriate, the involvement of funders.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), Integrating Activities should, whenever appropriate, pay due attention to any related international initiative (i.e. outside the EU) and foster the use and deployment of global standards.

Integrating Activities should also organise the efficient curation, preservation and provision of access to the data collected or produced under the project, defining a data management plan, even when they opt out of the extended Pilot on Open Research Data. Data management (including ethics and privacy issues), interoperability, as well as advanced data and computing services should be addressed where relevant. To this extent, proposals should build

upon the state of the art in ICT and e-infrastructures for data, computing and networking, and ensure connection to the European Open Science Cloud.

Integrating Activities should in particular contribute to fostering the potential for innovation, including social innovation, of research infrastructures by reinforcing the partnership with industry, through e.g. transfer of knowledge and other dissemination activities, activities to promote the use of research infrastructures by industrial researchers, involvement of industrial associations in consortia or in advisory bodies.

Integrating Activities are expected to duly take into account all relevant ESFRI and other world-class research infrastructures to exploit synergies, to reflect on sustainability and to ensure complementarity and coherence with the existing European Infrastructures landscape.

Proposals should include clear indicators allowing the assessment of the progress towards the general and specific objectives, other than the access provision.

As the scope of an integrating activity is to ensure coordination and integration between all the key European infrastructures in a given field and to avoid duplication of effort, advanced communities are expected to submit one proposal per area.

Further conditions and requirements that applicants should fulfil when drafting a proposal are given in part D of the section “Specific features for Research Infrastructures”. Compliance with these provisions will be taken into account during evaluation.

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

On the basis of a multiannual plan drafted taking into account the assessment and the timing of previous grants as well as strategic priorities and needs, in term of research infrastructures services, emerging from other parts of Horizon 2020, this work programme invites proposals addressing the following areas listed under the different domains. A balanced coverage of the various domains, in line with the distribution of areas per domain, is expected as outcome of this topic.

2018 deadline

Biological and Medical Sciences

- **Microbial Resource Centres.**
This activity aims at integrating the key Microbial Resource Centres and opening them up to European researchers for biotechnology research and development. Emphasis should be on widening the user base, enlarging and strengthening the offered services, sharing resources at global level, fostering the innovation role of such

infrastructures and ensuring long term sustainability to their integration.

- Facilities for high throughput DNA sequencing.
This activity aims at integrating the key research infrastructures in Europe as well as leading-edge research infrastructures located in **third countries**, to open them up to European researchers and offer services beyond the state-of-art which is already ensured by commercial providers. Adequate consideration should be taken of the produced data and its availability for research.
- Centres for replacement, reduction and refinement (3 Rs) of non-human primate testing.
This activity aims at integrating the key non-human primate centres in Europe promoting 3 Rs, i.e. replacement, reduction, and refinement. The proposal will contribute to the objective of 3Rs, reinforcing the implementation of ethical and good practices at European level, and the protection of animals used in scientific experiments^[3]. The proposal should also develop the necessary collaborations outside Europe.
- High throughput facilities for proteome analysis.
This activity aims at integrating the key high throughput facilities in Europe for proteome analysis, based on state-of-the-art proteomics techniques and tools for data handling and analysis, including structural proteomics and structural bioinformatics. Emphasis should be on widening the user base, enlarging and strengthening the offered services, fostering the innovation role of such infrastructures and ensuring long term sustainability to their integration.

Energy

- Research Infrastructures for solar energy:
concentrating solar power. This activity should bring together the key European research infrastructures in solar concentrating systems (solar concentrators and relating research infrastructures) for carrying out energy and materials research as well as research in other fields using the extreme temperature conditions in solar concentrators, e.g. thermal storage equipment and reuse of stored energy. This topic would support the European Strategic Energy Technology Plan (SET-Plan).
- Research Infrastructures for solar energy:
photovoltaic. This activity aims at integrating and opening the key research infrastructures in Europe for all aspects of photovoltaic research: buildings, transport, new materials, grid connection, efficiency, etc. This topic would support the European Strategic Energy Technology Plan (SET-Plan).

Environmental and Earth Sciences^[4]

- Research infrastructures for forest ecosystem and resources research. This activity aims at further integrating and facilitating broad access to forest research facilities, methodologies and data on genetic and species diversity to enable environmental and biological research including biological effects of air pollution, mitigation and adaptation to climate change, and development of forest management approaches. Emphasis will be on widening the user base and ensuring long term sustainability to the service integration.
- Natural history collections. This activity aims at integrating and improving access to key European Natural History collections and to their related instrumentation facilities. Emphasis should be on improving accessibility to collections to a wide range of scientists, on developing innovative research services to answer the needs of a broader scientific community of users from climate change to human health and food security, and on ensuring long term sustainability of the integrated services.
- Research aircrafts for environmental and geo-science research. This activity aims at integrating key research aircrafts and improving their availability to European researchers from larger multidisciplinary scientific communities. It should develop a long-term strategy towards sustained integrated services and innovative synergies with complementary observing systems and models to study atmospheric processes and the Earth's surface.
- Research vessels. This activity aims at further providing, integrating and improving access to the key European research vessels and associated major equipment. It should include innovative initiatives to ensure a more efficient and coordinated operation of European fleets, to develop synergies with complementary observing systems and infrastructures and to set-up sustained integrated services to the user communities.
- Research infrastructures for Earth's climate system modelling. This activity aims at further integrating and opening the research infrastructures (e.g. data repositories, models) used by the climate modelling community in Europe, promoting the ongoing development of a common distributed modelling infrastructure. Emphasis should be on widening the user base, expanding the interdisciplinary research fields addressed, enlarging and strengthening the offered services, and ensuring long term sustainability to the service integration.
- Sites and experimental platforms of anthropogenic impacts for ecosystem functioning and biodiversity research. This activity aims at bringing together highly instrumented experimental, analytical and modelling facilities, across all major

European ecosystem types and all major pressures on them. It will optimise the collaborative use of these sites by a wider scientific community and develop efficient methods and techniques for rapid data sharing and processing at the European level.

Mathematics and ICT

- Visualisation facilities. This activity aims at further integrating and opening key virtual reality visualisation facilities, holographic image processing facilities and other computer graphics and animation facilities for advanced visualisation of scientific information and massive data, either resulting from academic research or being produced in collaboration with the industrial sector. Emphasis should be on widening the user base, enlarging and strengthening the offered services, and fostering the innovation role of such infrastructures.

Material Sciences, Analytical facilities and Engineering

- Electron Microscopies for advanced imaging, diffraction, spectroscopy and metrology of materials. This activity aims at further integrating and opening advanced electron microscopies for material research and technological development. Emphasis should be on widening the user base, strengthening and enlarging the offered services, stimulating new scientific activities, facilitating access, fostering the innovation role of such infrastructures and ensuring long term sustainability to their integration.
- High and low energy ion beam labs. This activity aims at further integrating and opening key ion beam facilities for material, biomedical and environmental research and technological development. Emphasis should be on widening the user base, enlarging and strengthening the offered services, fostering the innovation role of such infrastructures and ensuring long term sustainability to their integration.
- Infrastructures for Neutron Scattering and Muon Spectroscopy. This activity will provide and facilitate wider access to the key research infrastructures in Europe for Neutron scattering and Muon Spectroscopy. It should present a long-term sustainable perspective on the integration of these facilities and related resources.
- Facilities for research on materials under extreme temperature conditions. This activity aims at integrating research facilities in physics and materials science dealing with extreme low and high temperature conditions, e.g. nanoscience at microkelvin temperatures. Emphasis should be on widening the user base, enlarging the offered services, fostering the innovation role of such infrastructures and ensuring long term sustainability to their integration.

- Infrastructures for studying turbulence phenomena and applications. This activity aims at further integrating key facilities enabling the study of high turbulence phenomena in various areas of science and technology. Emphasis should be on combining modelling and experimental in situ testing, widening the user base, enlarging the offered services, fostering the innovation role of such infrastructures and ensuring long term sustainability to their integration.

Physical Sciences

- Research Infrastructures for hadron physics. This activity will provide and facilitate access to key research infrastructures in Europe for studying the properties of nuclear matter at extreme conditions, turning advances in hadron physics experimentation into new applications. It should present a long-term sustainable perspective on the integration of relevant facilities and related resources.
- Research Infrastructures for high resolution solar physics. This activity aims at further integrating and opening key research infrastructures in the field of high resolution solar physics. It should foster cooperation between theory and observations.

Social Sciences and Humanities

- Research infrastructures for the assessment of science, technology and innovation policies. This activity aims at further integrating and opening research data infrastructures in the field of science, technology and innovation (including social innovation). Emphasis should be on facilitating trans-national access and widening the user base, enlarging and strengthening the offered services, fostering the innovation role of such infrastructures and ensuring long term sustainability to their integration.
- Digital archives and resources for research on European history. This activity aims at further integrating and opening key data collections and services in Europe for European History. Emphasis should be on widening the user base, enlarging and strengthening the offered services, e.g. by covering further historical periods, and ensuring long term sustainability to their integration.
- Archaeological data infrastructures for research. This activity aims at further integrating and opening key archaeological data infrastructures to facilitate research in all fields of archaeology (from prehistory to contemporary society). Emphasis should be on widening the user base, enlarging and strengthening the offered services, including fields such as paleo-anthropology, bioarchaeology and environmental archaeology, sharing resources at global level, and ensuring long term sustainability to their integration.

Expected Impact:

- Researchers will have wider, simplified, and more efficient access to the best research infrastructures they require to conduct their research, irrespective of location. They benefit from an increased focus on user needs.
- New or more advanced research infrastructure services, enabling leading-edge or multidisciplinary research, are made available to a wider user community.
- Operators of related infrastructures develop synergies and complementary capabilities, leading to improved and harmonised services. There is less duplication of services, leading to an improved use of resources across Europe. Economies of scale and saving of resources are also realised due to common development and the optimisation of operations.
- Innovation is fostered through a reinforced partnership of research organisations with industry.
- A new generation of researchers is educated that is ready to optimally exploit all the essential tools for their research.
- Closer interactions between larger number of researchers active in and around a number of infrastructures facilitate cross-disciplinary fertilisations and a wider sharing of information, knowledge and technologies across fields and between academia and industry.
- For communities which have received three or more grants in the past, the sustainability of the integrated research infrastructure services they provide at European level is improved.
- The integration of major scientific equipment or sets of instruments and of knowledge-based resources (collections, archives, structured scientific information, data infrastructures, etc.) leads to a better management of the continuous flow of data collected or produced by these facilities and resources.
- When applicable, the integrated and harmonised access to resources at European level can facilitate the use beyond research and contribute to evidence-based policy making.
- When applicable, the socio-economic impact of past investments in research infrastructures from the European Structural and Investment Funds is enhanced.

Cross-cutting Priorities: International cooperation, Gender, Open Science, Socio-economic science and humanities

^[1] See the Eligibility and admissibility conditions for this call.

^[2] See part D of the section “Specific features for Research Infrastructures”.

^[3] As framed by the directive 86/609/EEC, and by the Commission proposal for its revision, COM(2008)543

^[4] When appropriate, proposals addressing areas under this domain are encouraged to develop synergies with Copernicus data and information as well as with GEO/GEOS.

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| Horizon 2020 Pillar: | Excellent Science |
| Programme: | European research infrastructures (including e-Infrastructures) |
| Call Title: | Integrating and opening research infrastructures of European interest |
| Call Identifier: | h2020-infraia-2018-2020 |
| Topic Title: | Integrating Activities for Advanced Communities |
| Topic Identifier: | INFRAIA-01-2018-2019 |
| Type of Action: | RIA Research and Innovation action |
| Deadline(s): | 20-03-2019 (single-stage) |

Participant Portal Weblink:

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

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Scope: 'Advanced Communities' are scientific communities whose research infrastructures show an advanced degree of coordination and networking at present, attained, in particular, through Integrating Activities awarded under FP7 or previous Horizon 2020 calls.

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Funding will be provided to support, in particular, the trans-national and virtual access provided to European researchers (and to researchers from **Third countries** under certain conditions^[2]), the cooperation between research infrastructures, scientific communities, industry and other stakeholders, the improvement of the services the infrastructures provide, the harmonisation, optimisation and improvement of access procedures and

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Proposals from advanced communities will have to clearly demonstrate the added value and the progress beyond current achievements in terms of integration and services, of a new grant. The strongest impact for advanced communities is expected typically to arise from focusing on innovation aspects and widening trans-national and virtual access provision, both in terms of wider and more advanced offer of scientific services, than in terms of number of users and domains served. Furthermore, in particular for communities supported in the past under three or more integrating activities, the creation of strategic roadmaps for future research infrastructure developments as well as the long-term sustainability of the integrated research infrastructure services provided at European level, need to be properly addressed. The latter requires the preparation of a sustainability plan beyond the grant lifecycle as well as, where appropriate, the involvement of funders.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), Integrating Activities should, whenever appropriate, pay due attention to any related international initiative (i.e. outside the EU) and foster the use and deployment of global standards.

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upon the state of the art in ICT and e-infrastructures for data, computing and networking, and ensure connection to the European Open Science Cloud.

Integrating Activities should in particular contribute to fostering the potential for innovation, including social innovation, of research infrastructures by reinforcing the partnership with industry, through e.g. transfer of knowledge and other dissemination activities, activities to promote the use of research infrastructures by industrial researchers, involvement of industrial associations in consortia or in advisory bodies.

Integrating Activities are expected to duly take into account all relevant ESFRI and other world-class research infrastructures to exploit synergies, to reflect on sustainability and to ensure complementarity and coherence with the existing European Infrastructures landscape.

Proposals should include clear indicators allowing the assessment of the progress towards the general and specific objectives, other than the access provision.

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Further conditions and requirements that applicants should fulfil when drafting a proposal are given in part D of the section “Specific features for Research Infrastructures”. Compliance with these provisions will be taken into account during evaluation.

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

On the basis of a multiannual plan drafted taking into account the assessment and the timing of previous grants as well as strategic priorities and needs, in term of research infrastructures services, emerging from other parts of Horizon 2020, this work programme invites proposals addressing the following areas listed under the different domains. A balanced coverage of the various domains, in line with the distribution of areas per domain, is expected as outcome of this topic.

2019 deadline

The areas to be addressed under the different domains will be defined at a later stage, before the opening of the related call.

Expected Impact:

- Researchers will have wider, simplified, and more efficient access to the best research infrastructures they require to conduct their research, irrespective of location. They benefit from an increased focus on user needs.

- New or more advanced research infrastructure services, enabling leading-edge or multidisciplinary research, are made available to a wider user community.
- Operators of related infrastructures develop synergies and complementary capabilities, leading to improved and harmonised services. There is less duplication of services, leading to an improved use of resources across Europe. Economies of scale and saving of resources are also realised due to common development and the optimisation of operations.
- Innovation is fostered through a reinforced partnership of research organisations with industry.
- A new generation of researchers is educated that is ready to optimally exploit all the essential tools for their research.
- Closer interactions between larger number of researchers active in and around a number of infrastructures facilitate cross-disciplinary fertilisations and a wider sharing of information, knowledge and technologies across fields and between academia and industry.
- For communities which have received three or more grants in the past, the sustainability of the integrated research infrastructure services they provide at European level is improved.
- The integration of major scientific equipment or sets of instruments and of knowledge-based resources (collections, archives, structured scientific information, data infrastructures, etc.) leads to a better management of the continuous flow of data collected or produced by these facilities and resources.
- When applicable, the integrated and harmonised access to resources at European level can facilitate the use beyond research and contribute to evidence-based policy making.
- When applicable, the socio-economic impact of past investments in research infrastructures from the European Structural and Investment Funds is enhanced.

Cross-cutting Priorities: International cooperation, Gender, Open Science, Socio-economic science and humanities

^[1] See the Eligibility and admissibility conditions for this call.

^[2] See part D of the section “Specific features for Research Infrastructures”.

Industrial Leadership

| | |
|-----------------------------|--|
| Horizon 2020 Pillar: | Industrial Leadership |
| Programme: | Information and Communication Technologies |
| Call Title: | Information and Communication Technologies |
| Call Identifier: | h2020-ict-2018-2020 |
| Topic Title: | EU- China 5G Collaboration |
| Topic Identifier: | ICT-22-2018 |
| Type of Action: | RIA Research and Innovation action |
| Deadline(s): | 31-01-2018 (single-stage) |

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/ict-22-2018.html>

Specific Challenges: The next phase of 5G activities running during the 2018-20 period is expected to cover, both in EU and in **China**, technologies and systems demonstrations and trials. The challenge is hence to demonstrate technologies and system interoperability for a number of core applications of interest in the two regions.

Scope: The scope is to conduct 5G trials addressing two specific scenarios: scenario n°1 - enhanced Mobile Broadband (eMBB) on the 3.5GHz band, which is a priority band in the two regions for early introduction of very high rate services; and scenario n°2 - Internet of Vehicles (IoV) based on LTE-V2X using the 5.9 GHz band for Vehicle-to-Vehicle (V2V) and the 3.5 GHz band for Vehicle-to-Network (V2N). The overall goal is to evaluate in real setup innovative end-to-end 5G systems built on the outcomes of the previous phases of the 5G R&I. More specifically, the optimisation of the band usage in multiple scenarios with different coverage is a key target, so as the validation of the geographic interoperability of the 3.5 and 5.9 GHz bands for these use cases. Both scenarios shall be implemented in both regions (EU and **China**) through testbeds with interoperability forming the core of the R&I work.

The underlying trials' testing facilities shall implement the latest mature and broadly commonly agreed 5G systems, network architectures and technologies spanning from the core/transport networks, the radio access, up to the service, orchestration, management and security components. The trial facility shall not be restricted to innovative 5G radio access technology, but should include and enable the evolution of 5G networks innovations in network slicing, virtualisation, cross-domain orchestration, in view of supporting resource control from multiple tenants. In EU, trials are preferably

implemented over the 5G end-to-end platforms developed under ICT-17-2018.

The 5G trials' infrastructures shall facilitate the testing and validation of innovative applications for each of the defined scenarios, including efficiency solutions in the areas of spectrum usage, energy consumption and costs.

As per cPPP objectives, relevant industries and organisations are expected to have a sizeable share of the proposals participation. Teams including mobile operators, vendors (for both scenarios) and car companies (for scenario n°2 IoV) together with SMEs, academia and research institutes may be considered.

Proposals shall foresee twinning with entities participating in projects funded by **China** to exchange knowledge and experience and exploit synergies. This topic is calling for bilateral project twinning with the National Science and Technology Major Project (NSTMP) "mirror project" launched by **China** in 2018. Proposals shall foresee all the mechanisms, including budget provisions, to enable close collaboration with the "5G Major Project" that will be funded by **China**. The two twinning projects (EU/**China**) will be requested to define and use unified trial specifications, unified trial frequency bands and to share data. Joint deliverables, like joint tests reports, white papers, publications and standard contributions, will also be expected. In addition, the 5G trials' infrastructures shall be deployed in one or more cities in each region (EU/**China**).

The Commission considers that proposals requesting a contribution from the EU up to EUR 6 million for a period between 24 and 36 months would allow this area to be addressed appropriately. This does not preclude the submission and selection of proposals with a different budget or duration.

Expected Impact:

- Holistic 5G networks implementations based on the latest 5G innovations and evaluated in the two prominent usage scenarios.
- 5G RAN for the specified bands validated in real world environments.
- Global interoperability demonstrations for 5G networks.
- Joint contributions to global 5G standards specifications in relevant organisations (e.g. 3GPP, ITU-R), especially in view of 5G phase 2 standardisation (beyond eMBB), and to harmonized spectrum bands.
- Successful showcasing events with, ideally, joint demonstration across regions.
- New or reinforced cooperation between 5G R&I stakeholders from EU and **China**, with a focus on private companies (industry, telecom operators, SMEs).

Cross-cutting Priorities: International cooperation

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|-----------------------------|---|
| 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.

It is encouraged to cooperate on data processing and applications using the Copernicus DIAS, 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.

Activities shall include joint cal/val activities or integration of local in-situ systems to enhance 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 projects to be funded under this topic:

- Participation of partners from countries that have signed a Copernicus Cooperation Arrangement^[2] is required;
- Participation of industry, in particular SMEs, is encouraged;
- 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 staving 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

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| Horizon 2020 Pillar: | Industrial Leadership |
| Programme: | Nanotechnologies, Advanced Materials, Biotechnology and Advanced Manufacturing and Processing |
| Call Title: | Transforming European Industry |
| Call Identifier: | h2020-nmbp-tr-ind-2018-2020 |
| Topic Title: | New biotechnologies for environmental remediation (RIA) |
| Topic Identifier: | CE-BIOTEC-04-2018 |
| Type of Action: | RIA Research and Innovation action |
| Deadline(s): | 25-04-2018 (single-stage) |

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/ce-biotec-04-2018.html>

Specific Challenges: Contamination of soils, sediments, ground and surface water caused by waste resulting from human action and leakage into water sources is a serious problem. This pollution contains compounds having toxicity and durability which creates important concerns from the health and environmental viewpoints. Moreover, it represents a significant economic burden for society.

In some standard remediation strategies, for example burying polluted soils in landfills, pollutants are not destroyed and the problem is merely postponed. Chemical remediation and the disposal of contaminated waste increase the health risk for workers. Bioremediation, which uses naturally occurring microorganisms, is a more sustainable and gentle alternative to physicochemical options.

Microorganisms have developed countless strategies to depollute their environment and to transform harmful environmental contaminants into harmless end products. However, the effectiveness of bioremediation faces a number of challenges, for instance the concentration of the contaminant, the combined biological activity of the microbial community over time and space and the consumption of energy.

Scope: Proposals should include research and innovation for efficient and low cost remediation strategies using microorganisms by means of (bio)-electrochemical systems, or alternate systems that require minimum or zero external energy or chemicals. The work should ensure that an acceptable performance for field applications can be attained. Remediation should cover hydrocarbons and their derivatives, metals, nutrients, antibiotics or

micropollutants. Moreover, the system developed should remove different contaminants, including complex mixtures, the remediation time should be accelerated and it should work with mixed microbial communities.

This topic is part of the EU-**China** flagship initiative on Biotechnology for Environment and Human Health, which will promote substantial coordinated and balanced research and Innovation cooperation between the EU and **China**. **China**-based participants have the possibility to apply for funding under the **Chinese** co-funding mechanism and other **Chinese** sources^[1].

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

The Commission considers that proposals requesting a contribution from the EU up to 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:

- Remediation of at least two toxic contaminants;
- Proof of the feasibility of scaling up the technology for field testing, including an assessment of the related environmental benefits and risks;
- A demonstration of the benefits over standard physicochemical remediation approaches, including energy efficiency.

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

^[1] <http://www.nsf.gov.cn/publish/portal1/>

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| Horizon 2020 Pillar: | Industrial Leadership |
| Programme: | Nanotechnologies, Advanced Materials, Biotechnology and Advanced Manufacturing and Processing |
| Call Title: | Transforming European Industry |
| Call Identifier: | h2020-nmbp-tr-ind-2018-2020 |
| Topic Title: | Microorganism communities for plastics bio-degradation (RIA) |
| Topic Identifier: | CE-BIOTEC-05-2019 |
| Type of Action: | RIA Research and Innovation action |
| Deadline(s): | 24-04-2019 (single-stage) |

Participant Portal Weblink:

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

Specific Challenges: The global market for plastics continues to grow due to their physical properties and benefits such as light weight, reduction of food waste, durability and cost. After being used, plastics should be separated in order to be subject to the most appropriate waste treatment processes. This is increasingly difficult and inefficient due to, for example, consumers' inaccurate identification of the appropriate types of plastics for recycling. Other plastic types, such as polystyrene, can even not be recycled if they have traces of food.

Despite the worldwide efforts for degradation or recycling, large amounts of mixtures of plastics and other polymers end up in landfills or are used for the generation of energy. These methods lead to environmental contamination through the production of CO₂ or due to plastics reaching water courses and the sea where they persist and become toxic for the whole food chain. Novel biotechnological approaches should be applied for the sustainable biological degradation of mixtures of recalcitrant and degradable plastics.

Scope: Proposals will develop environmentally friendly and sustainable solutions for managing the waste of plastics mixtures based on the use of communities of microorganisms with a set of complementary enzymes. The enzymes may be native or engineered using state of the art biotechnologies. The microbial organisms will turn plastic mixtures into chemical constituents facilitating mineralisation, composting of otherwise recalcitrant and toxic polymers and facilitating production of high value products. Polymers such as polystyrene can also be included in the proposals.

Proposals should:

- produce cocktails of enzymes using communities of microorganisms capable of degrading mixtures of biodegradable and currently non-biodegradable plastics into more basic chemical constituents;
- use a multidisciplinary approach based on biotechnology;
- create high value products and valorise mixed plastic waste.

This topic is part of the EU-**China** flagship initiative on Biotechnology for Environment and Human Health, which will promote substantial coordinated and balanced research and Innovation cooperation between the EU and **China**. **China**-based participants have the possibility to apply for funding under the **Chinese** co-funding mechanism and other **Chinese** sources^[1].

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

The Commission considers that proposals requesting a contribution from the EU up to 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:

- A combination of microorganisms expressing at least three novel or improved enzymatic activities enabling the degradation of mixtures of plastics;
- Degradation of at least 20 percent of non-biodegradable plastics found in plastic mixtures. The objective is to include relevant indicators that prove this impact;
- Identification of the metabolic pathways leading to at least two high added value products that could be sustainably produced in future from plastic mixtures;
- Description of a sustainable and environmentally friendly pilot system for the degradation of plastic mixtures.

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

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

^[1] <http://www.nsf.gov.cn/publish/portal1/>

Societal Challenges

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| 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): | 27-02-2018,04-09-2018 (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 **China**. 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 **Chinese** research partners, government agencies and urban authorities, private sector and civil society with relevant expertise and competence and foster participatory engagement in urban ecological restoration actions. Further to the eligibility and admissibility conditions applicable to this topic, proposals are encouraged to ensure, to the extent possible, an appropriate balance in terms of effort and/or number of partners between the EU and the international partners, which would correspond to their respective ambition, objectives and envisaged work. This would enhance the impact of the actions and the mutual benefits for both the EU and the international partners.

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

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

Actions should address the following topic:

Strengthening EU-**China** collaboration (2018)

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

China-based participants have the possibility to apply for funding under the **Chinese** co-funding mechanism and other **Chinese** sources^[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 benefits from restored urban ecosystems with regards to urban liveability, climate change resilience, social inclusion, urban regeneration, public health and well-being;
- guidelines for cost effective urban ecosystem restoration and ecological rehabilitation measures and new planning approaches and methods.

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

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

^[2] 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

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| 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: | The changing cryosphere: uncertainties, risks and opportunities |
| Topic Identifier: | LC-CLA-07-2019 |
| Type of Action: | CSA Coordination and support action |
| Deadline(s): | 19-02-2019 (single-stage) |

Participant Portal Weblink:

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

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

Scope: Actions should aim at developing innovative approaches to address the following sub-topic:

Arctic standards

The action should propose guidelines and protocols to develop 'Arctic standards', also including the legal framework, based on the translation of research outcomes into cold-climate technologies and services with commercial potential and the assessment of the sustainability of associated processes and technologies. The action should cover a wide range of technologies and services that have the potential to bring broad social and economic benefits within and beyond the Arctic region. The action should also provide requirements on how to design, build, install, and operate

equipment and services to safely perform activities in the Arctic and to respond to emergencies.

The participation of standardisation organisations is encouraged.

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

For the above sub-topic, in line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged^[1], in particular with countries – beyond the EU Member States and countries associated to Horizon 2020 – that took part in the first Arctic Science Ministerial of 28 September 2016^[2].

Expected Impact:

The project results are expected to contribute to:

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

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

^[1] Proposals should pay attention to the special call conditions for this topic.

^[2] i.e. the United States of America, Canada, the People's Republic of **China**, Japan, the Russian Federation, South Korea, New Zealand, India, Singapore, and Greenland; see https://www.arctic.gov/publications/other/supporting_arctic_science.html

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| 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: | The changing cryosphere: uncertainties, risks and opportunities |
| Topic Identifier: | LC-CLA-07-2019 |
| 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-07-2019.html>

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

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

a. Sea-level changes

Actions should assess the processes controlling changes to global ice mass balance - including ice dynamics - such as ice shelf-ocean and sea-ice interactions, surface components, effects of crustal de-loading (Glacial Isostatic Adjustments) on relative sea-level changes and/or gravitational effects of ice mass changes on the spatial patterns of sea-level changes. Actions should assess the status of ice sheets and glaciers, report on how their changes are likely to affect future sea-levels, and increase confidence in predicting changes in the cryosphere including through better representation of poorly represented processes. Actions should

also analyse low-probability high-impact scenarios including those associated with the collapse of ice sheets (sea-level fingerprints). Actions may be focused on specific issues which substantially contribute to sea-level changes and to the assessment of the associated major risks to and impacts on coastal communities, coastal ecosystems and critical infrastructure across the globe.

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

b. Changes in Arctic biodiversity

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

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

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

c. Sustainable opportunities in a changing Arctic

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

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

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

preclude submission and selection of proposals requesting other amounts.

For all of the above sub-topics, in line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged^[1], in particular with countries – beyond the EU Member States and countries associated to Horizon 2020 – that took part in the first Arctic Science Ministerial of 28 September 2016^[2].

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

- the implementation of the new integrated EU policy for the Arctic^[3];
- the IPCC assessments and other major regional and global initiatives;
- enhanced engagement of and the interaction with residents from local communities and indigenous societies.
- For projects addressing part d), the project results are expected to contribute to:
 - enhanced stakeholder capability to operate in cold climate environments;
 - better servicing of the economic sectors that operate in the Arctic (e.g. shipping, tourism);
 - promoting sustainable Arctic opportunities arising from climate change and supporting the leverage of regional (EU) funds into these opportunities;
 - supporting the competitiveness of European industry, particularly SMEs, engaging in sustainable development of the Arctic.

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

^[1] Proposals should pay attention to the special call conditions for this topic.

^[2] i.e. the United States of America, Canada, the People's Republic of **China**, Japan, the Russian Federation, South Korea, New Zealand, India, Singapore, and Greenland; see https://www.arctic.gov/publications/other/supporting_arctic_science.html

^[3] JOIN(2016) 21 final

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| Horizon 2020 Pillar: | Societal Challenges |
| Programme: | Europe in a changing world – Inclusive, innovative and reflective societies |
| Call Title: | GOVERNANCE FOR THE FUTURE |
| Call Identifier: | h2020-sc6-governance-2018-2019-2020 |
| Topic Title: | Partnering for viability assessments of innovative solutions for markets outside Europe |
| Topic Identifier: | GOVERNANCE-08-2018 |
| Type of Action: | CSA Coordination and support action |
| Deadline(s): | 13-03-2018 (single-stage) |

Participant Portal Weblink:

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

Specific Challenges: New and emerging markets outside Europe offer huge opportunities for the European industry. To compete effectively in these markets, European companies and especially SMEs need to develop partnerships with innovation players in these economies from early on and to develop receptiveness for local success. This is crucial to better understand the specific market context and the consequent needs and demands of emerging users and consumers. The end goal is to bring a new product, service or process to the foreign market, possibly through an innovative application of existing technologies, methodologies, or business processes.

Scope: This action will enhance the evidence base for EU R&I policy through in-depth analyses of the outcomes, experiences and impacts of a critical number of viability assessment projects of innovative solutions for markets outside Europe.

The assessment projects will be selected following a series of open calls organised by the action. The proposal for undertaking the action should define the organisational process for selecting the assessment projects for which financial support will be granted, including the process of selecting, allocating and reporting on the use of independent experts and ensuring no conflicts of interest.

At least 80% of the EU funding shall be allocated to financial support for the third parties carrying out the selected assessment projects. The series of open calls shall address markets of developing countries, large **Emerging**

Economies (Brazil, Russia, India, **China**, Mexico) and developed countries with roughly the same allocation for each of these three country category.

The calls should specify that each assessment project should include a wide variety of activities to explore the practical, technological and commercial viability of an innovative solution in particular in terms of how it needs to meet local conditions and demands.

The proposal must clearly detail a fixed and exhaustive list of the different types of activities for which a third party may receive financial support such as market studies, partner search and networking, approaches for client/user involvement including societal, behavioural and cultural aspects, and other activities aimed at overcoming barriers for market introduction and uptake.

The proposal must clearly detail the criteria for awarding financial support and simple and comprehensive criteria for calculating the exact amount of such support, which may not exceed EUR 60 000 for each assessment project. The award criteria must be objective and non-discriminatory.

Each assessment project shall be led by an entity established in an EU Member State or Horizon 2020 Associated Country and shall involve at least one entity not established in an EU Member State or Horizon 2020 Associated Country. The proposal shall specify whether and how the latter would be funded according to its type of involvement (e.g. subcontractor, cooperation agreement) and its geographic origin (country automatically eligible for funding or not according to Horizon 2020 rules). Highly innovative SMEs with clear commercial ambitions and potential for high growth and internationalisation shall be targeted in particular.

The open calls must be published widely, including on the Horizon 2020 Participants Portal and through National Contact Points, and Horizon 2020 standards with respect to transparency, equal treatment, no conflict of interest and respect of confidentiality must be adhered to. The results of the calls must be published without delay, including, for each assessment project, a description of the project, the legal name and country of the third party, the start date and duration of the project, and the amount of the award.

The proposal should specify how it will promote the calls, how it will monitor and report on call results and how it will assess the quality of the outcomes and experiences from the assessment projects, as well as how it will provide regular in-depth analyses and which indicators will be used for measuring the impacts achieved. Analyses should draw up R&I policy conclusions on questions such as which additional joint R&I activities in third countries should be supported, what framework conditions for R&I cooperation need improving, and what further R&I support services should be implemented.

The Commission considers that a proposal requesting a contribution from the EU of up to EUR 9 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting another amount. The selected beneficiary or beneficiaries should have a solid operational and financial capacity.

Expected Impact:

- Economic growth and job creation, both in Europe and in the target countries, as well as additional societal and environmental benefits.
- Increased European economic and industrial competitiveness and excellence and participation in international value chains.
- Inclusion of locally developed and accepted technology and business models, including through co-creation with innovation players in the target countries.
- Greater availability, uptake and use of innovative solutions responding to the specific local needs and circumstances of the target countries and markets.
- R&I policy conclusions based on better connections and larger insights into market conditions outside Europe.

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

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| 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: | Highly efficient management of soil quality and land resources |
| Topic Identifier: | SFS-38-2018 |
| Type of Action: | RIA Research and Innovation action |
| Deadline(s): | 13-02-2018,11-09-2018 (two-stage) |

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/sfs-38-2018.html>

Specific Challenges: Production, protection and remediation are the three major components for securing global food supply on limited land resources for the growing global population. As competition between urban, industrial/transportation and agricultural land uses increases, food production needs to be maintained on decreasing land areas. To achieve a new balance on a higher output level, with possibly less input is the ultimate goal of resource use efficiency, sustainable management and competitiveness of agriculture. Land suitability-based management with prioritisation of targets (outputs) has to be in place and life cycle assessment of nutrient flows need to be included. Harmonisation between environmental and social targets has to be made on the basis of common/harmonised data and parameters of soil and land. Research should focus more on priority areas in the optimisation of land use and environmental protection taking into consideration the specific ecological and socio-economic conditions in **China** and Europe.

Scope: Harmonising land information is crucial for building common understanding of the resource base, with special regard to prime land. Harmonisation should be based on the Eur**Asian** coverage of the new global soil map, incorporating local soil information. Indicators for sustainable intensification and delineation of both prime agricultural land and problem lands should be defined. Options for a trade-off between ecology and productivity should be demonstrated for both productive and less productive land. Influence of climate change and impact of land use change should be incorporated to the models, especially targeting the loss of prime land. The achievement of a new

balance should also consider the socio-economic context. In order to achieve the suitability-based highly-efficient land resources management, focus has to be on soil properties (carbon in particular), nutrient input to soil (N, P, K) and N fixation. Proposals shall promote balanced research and innovation cooperation between the EU and **China**. **China**-based entities that will participate in joint projects with European partners under Horizon 2020 have also the possibility to apply for funding under the **Chinese** co-funding mechanism.

The Commission considers that proposals requesting a contribution from the EU of up to 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. Contributions for **Chinese** participants will come in addition and will be made available by **China**.

Expected Impact:

in the short to medium term:

- Introduce a new harmonised land information base for Europe and **China**;
- Propose indicators and management solutions for a new balance of soil resource utilisation;
- Raise public awareness about land as a crucial global resource;
- Improvement of common understanding of prime land and problem land in the global context.

In the long term enhance EU-**China** cooperation in land use optimisation for global food and environmental security.

Cross-cutting Priorities: International cooperation

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| 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: | High-quality organic fertilisers from biogas digestate |
| Topic Identifier: | CE-SFS-39-2019 |
| 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-sfs-39-2019.html>

Specific Challenges: Public policies in **China** and in several EU Member States have promoted the use of anaerobic digestion to treat organic wastes and to generate renewable energy. This has resulted in the production of considerable volumes of digestate as by-product, which could raise an environmental concern, prove costly and represent an inefficient use of biomass. The most straight-forward option for placing a value on digestate is to use it as an organic fertiliser and soil amender. However digestate is not highly appreciated by farmers as a soil treatment due to its significant shortcomings. These may include, amongst other things and depending on the feedstock source, potential risks of water pollution through leaching, soil contamination, or a threat to human health by food contamination. Furthermore, digestate is difficult to manage due to its fertilising properties, format and high water content.

Scope: Projects shall develop treatment technologies to convert digestate into a suitable fertiliser or soil amender. They could focus on a specific digestate type or develop a flexible process covering a variety of digestates. These treatments shall (i) reduce risks linked to biological and chemical hazards (including AMR) to acceptable levels, (ii) improve fertilising properties and (iii) address issues related to format, formulation and handling. Proper solutions must be sought for the liquid phase to avoid pollution.

The fertiliser developed must be suitable for direct use, or for mixed formulation with other fertilisers. Field tests must be implemented over an appropriate period of time to assess its agronomic properties, as well as its effect on the environment (including greenhouse gas emissions), and on food

safety. Projects shall focus on technologies that could be deployed in a decentralised manner, at a relatively small scale. Such technologies shall achieve a technology readiness level (TRL) 6-7 by the end of your project. A comprehensive impact assessment (economic, environmental and social) of the business model shall be carried out, and policy recommendations shall be provided to boost its deployment.

Proposals shall ensure solid collaboration between agro-food actors, technology providers, research centres, end-users (farmers and farmers associations), and public administration. Projects shall perform a thorough analysis of the state of the art, and demonstrate that your proposed activities go beyond this state and do not overlap with past or ongoing research.

Proposals shall include a task to cluster with other projects financed under topic RUR CE-08-2018/2019/2020 and — if possible — with other relevant projects in the field funded by Horizon 2020, including under the Bio-based Industries Joint Undertaking (BBI JU). Proposals shall promote balanced research and innovation cooperation between the EU and **China**. **China**-based entities that will participate in joint projects with European partners under Horizon 2020 have also the possibility to apply for funding under the **Chinese** co-funding mechanism.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude the submission and selection of proposals requesting other amounts. Contributions for **Chinese** participants will come in addition and will be made available by **China**.

Expected Impact: Projects are expected to provide the technologies needed to develop commercial fertilisers based on biogas digestate. This will help to:

- replace conventional, non-renewable mineral fertilisers, hence reducing external dependence and risks related to depletion;
- reduce the environmental impacts linked to the inadequate management of biogas digestate, and to the production of fossil-based fertilisers;
- develop new business models in rural areas, that are synergised with existing ones, creating value from digestate.

In the long term, this shall contribute to a more circular, resource-efficient and sustainable agro-food sector, and create wealth and quality jobs in rural areas.

Projects shall also contribute to increasing the innovation capacities of participating organisations, and to strengthening scientific and industrial collaboration between the EU and **China**.

Cross-cutting Priorities: International cooperation

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| 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: | Integrated approaches to food safety controls across the food chain |
| Topic Identifier: | SFS-37-2019 |
| 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/sfs-37-2019.html>

Specific Challenges: Food safety in the food chain is a basis for effective functioning of national and international markets with trust and transparency. Food safety risks occur along the food chain from a number of biological and chemical contaminants. In addition, malpractices or fraudulent practices could also lead to increased food safety risks. Improving risk assessment and monitoring, including the use of big data, is of major importance. Developing integrated approaches along the entire food chain for detecting, assessing, and mitigating relevant pathogens and contaminant hazards is essential. It implies efficient food safety control systems, supported by reliable authentication and traceability approaches, being implemented across the entire food chain, focusing on the combination of hazard monitoring and control options in the specific stages of the food chain where the impact would be greater, or combinations of these at multiple stages. This is in particular challenging for SMEs which is a predominant entrepreneurial model across the agri-food sector, both in the EU and **China**.

Scope: Proposals should look at the development of an integrated approach for detecting, assessing and mitigating food safety risks from biological and chemical hazards (whether emerging or not) through the entire food chain/s (from primary production to consumers) and include common risks such as environmental contamination, process contamination, contamination through packaging and misuse or adulteration. They should tackle specific sector/s while taking into account the diversity of the supply chains within sector(s). The research activities should gather relevant data to assess risks and deliver practical solutions (technology and management related) in order to control

those hazards and their combinations at specific stages of the food chain where interventions can deliver the most efficient and greatest possible impact on public health. Activities will develop detection and monitoring tools that will allow for the data collection, integration, validation and analysis. Proposals will establish and validate non-targeted and targeted rapid detection methods for the screening and identification of biological and chemical hazards. Special attention will be given to developing and/or improving systems ensuring process efficacy and validation for hazard control. Proposed activities will encompass work within the food safety risk analysis framework while at the same time developing simple and practical decision support tools tailored towards the needs of agri-food sector (SMEs in particular) and scientific stakeholders. Proposals will fall under the concept of the 'multi-actor approach'^[1] and allow for the adequate involvement of SMEs and food safety control authorities. Proposals should include a task to cluster with other project/s financed under this topic and ensure complementarity with activities of EU-**China**-Safe project funded in response to the topic "SFS-45-2016: Increase overall transparency of processed agri-food products". Proposals shall promote balanced research and innovation cooperation between the EU and **China**. **China**-based entities that will participate in joint projects with European partners under Horizon 2020 have also the possibility to apply for funding under the **Chinese** co-funding mechanism.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 4 million would allow this specific challenge to be addressed properly. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Contributions for **Chinese** participants will come in addition and will be made available by **China**.

Expected Impact: Overall, activities will improve food safety control systems (implementation, inspection and controls) along the food chain.

In the short to medium term work will:

- Ensure and enhance the transparency and reliability of food safety along the entire food chain (including the e-commerce mean) with regard to international trade and internal EU and **Chinese** markets;
- Enhance the capacity of food SMEs and operators along the chain to detect, assess and mitigate food safety risks stemming from relevant pathogens, contaminant hazards and counterfeit food;
- Improve the effectiveness and efficiency of the controls performed by the food safety authorities along the food chain;
- Contribute to standard setting and regulatory cooperation in the EU and **China**.

In the longer term funded activities will increase food safety along the food chains in the EU and **China**.

Cross-cutting Priorities: International cooperation, Blue Growth, RRI

^[1] See definition of the 'multi-actor approach' in the introduction to this Work Programme part.

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| 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: | Global Alliance for Chronic Diseases (GACD) - Scaling-up of evidence-based health interventions at population level for the prevention and management of hypertension and/or diabetes |
| Topic Identifier: | SC1-BHC-16-2018 |
| Type of Action: | RIA Research and Innovation action |
| Deadline(s): | 18-04-2018 (single-stage) |

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/sc1-bhc-16-2018.html>

Specific Challenges: The **Global Alliance for Chronic Diseases**^[1] (**GACD**) aims to coordinate research on chronic diseases at a global level in order to enhance knowledge exchange across individual projects, and to better understand the impact of socio-economic, cultural, geopolitical and policy on research findings, so as to appropriately adapt interventions and scale-up to different geographical, economic and cultural settings. The **GACD** call will support research associated with the scale-up of interventions for the prevention and/or management of hypertension and/or diabetes in low- and middle-income countries (LMIC^[2]) and/or in vulnerable populations in High Income Countries (HIC).

Hypertension affects one billion people worldwide and is a major contributor to the growing global pandemic of cardiovascular disease and stroke. It is estimated that raised blood pressure indirectly currently kills approximately 8 million people every year^[3], while cardiovascular disease accounts for approximately 18 million deaths a year^[4], nearly one third of total deaths. Not only is hypertension more prevalent in LMIC, there are also more people affected because a larger proportion of the population live in those countries than in HIC.

Poor hypertension control and the absence of strategies to maintain normal blood pressure, particularly in LMICs and in vulnerable populations in HIC, reflect the challenges of effective and affordable implementation in healthcare and other sectors.

In the past twenty years the global death rate from diabetes has doubled and the World Health Organisation is predicting that this will increase by two thirds by 2030. It is currently estimated that 422 million adults worldwide suffer from diabetes of which 80% are from LMIC. In 2012, an estimated 1.5 million deaths were directly caused by diabetes and another 2.2 million deaths were attributable to high blood glucose^[5].

Identifying and evaluating interventions to assess efficacy is not always enough to ensure their wide uptake in the real-world. Even when information, tools and interventions have been tested within real-world effectiveness studies, the development of knowledge to support their broader uptake^[6] has often remained outside the remit of research. Effectively implementing and scaling-up interventions, programmes, and policies to the regional and national levels are persistent challenges.

It is essential that policy makers, communities, families, caregivers, patients, as well as healthcare practice and other settings are equipped with evidence-based strategies to integrate scientific knowledge and effective interventions into everyday use. Researchers have found it challenging to ensure that tools and interventions deemed efficacious within clinical or community-based trials are readily adopted and implemented. Scaling-up interventions to large populations is not a straightforward task. In practice, translation from a pragmatic trial to the real-life commissioning and continuous delivery of an intervention across a health system is a huge political and economic challenge. Without intentional, guided efforts to scale-up, a new evidence-based intervention might not be broadly implemented.

Scope: Proposals must focus on the scale-up of interventions at population level for hypertension and/or diabetes prevention and/or management in LMIC, and/or in vulnerable populations in HIC. Proposals addressing comorbidities with either hypertension or diabetes, including between them, are encouraged.

Proposals must align with commitments or planned commitments at a regional or country level to implement evidence-based interventions (including evidence of cost-effectiveness and affordability) across health or other sectors. Policymakers, intervention payers (excluding research funding agencies), researchers (including local researchers), implementers and beneficiaries should be involved at all stages of the intervention development and implementation design to identify the challenges to intervention delivery in real settings. Such partners will be integral to the success and sustainability of the programme and it is essential that they are engaged early, and participate actively in the design of the research proposal. Researchers should collaborate closely with the authorities responsible for the programme's delivery. Those authorities must pay for and provide the interventions, possibly through loans contracted from development banks or other financial providers. Proposals will carry out the research associated with the scale-up of the intervention.

Proposals must build on evidence-based interventions (including evidence of cost-effectiveness and affordability) for the respective population groups under defined contextual circumstances and should seek to replicate and scale-up interventions. The selected interventions to be scaled-up should have been proven to be equitable, safe, effective, and efficient as well as making local health systems and health services more responsive and person-centred. In particular, proposals should:

- Be targeted at the regional or national level.
- Identify, develop, test, evaluate and/or refine strategies to scale-up evidence-based practices^[7] into public health, clinical practice, and community settings.
- Identify, understand, and develop strategies for overcoming barriers to the adoption, adaptation, integration, scale-up and sustainability of evidence-based interventions, tools, policies, and guidelines. They should address a range of scale-up challenges, including complex processes, inefficient use of resources, inequitable allocation of resources, and supply and demand barriers to scaling-up and sustainability.
- Identify, understand, and develop strategies for measuring the unintended consequences of intervening at a system level.
- Use scale-up methods, tools, and approaches to enhancing equity, efficiency, people-centred, and responsive health systems, promoting a culture of evidence-informed learning, engaging stakeholders, and improving decisions on policies and programmes to achieve better health outcomes.
- Be aligned with existing policies, programme management, monitoring and evaluation processes. They may include important shifts in the practices, incentives, and engagement of global, national and regional health policy, regulatory frameworks, management, research, publication, and civil society stakeholders.
- Include health economic assessments as an integral part of the proposed research.
- Demonstrate that policy makers and health authorities are supportive of, and have been engaged in designing the research proposal.

Proposals should be multidisciplinary and cross-sectorial. Relevant gender and cultural aspects, as well as vulnerable populations, should be taken into account. Proposals may build on previous hypertension and diabetes projects supported under the **GACD** that have demonstrated the potential for impact.

The proposal will cover the research around the scaling up of the interventions. The research may cover:

- Identification of the best evidence-based interventions;
- Definition and implementation of optimum scale-up methods (e.g. pilots in multiple settings, defining a scalable unit);
- Embed real time monitoring/evaluation to refine protocols and ensure adaptability and effective uptake;
- Evaluation of health outcomes;

- Where appropriate, make recommendations for the replication of the applied scale-up interventions to other countries or very large regions.

Research under **GACD** involves regular exchange of research findings and information across participating projects by means of cross-project working groups and annual joint meetings. Wherever feasible, projects should harmonise and standardise their data collection and exchange data. Applicants must budget for annual costs of having two team members participate in one annual face-to-face meeting of the Annual Scientific Meeting (location to vary annually).

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.

Expected Impact:

(one of or combinations of):

- Enhanced programmes and policies that can significantly reduce the numbers of patients with hypertension and/or diabetes through prevention.
- Enhanced programmes and policies that can significantly increase the number of patients for whom hypertension and/or diabetes was previously undetected.
- Enhanced programmes and policies that can significantly increase the number of patients for whom hypertension and/or diabetes is controlled.
- Enhanced effective, efficient, equitable and sustainable health systems, to lesser inequalities and greater health equity and additional societal benefits, in the medium and long-term.
- Improved health services more responsive to the need of the comorbidities of hypertension and diabetes and other non-communicable diseases.
- Recommendations to translate findings to other countries or very large regions.
- Contribute to the attainment of the sustainable development goals for non-communicable diseases^[8].

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

^[1] <http://www.gacd.org/>

^[2] World Bank country classification based on estimates of gross national income per capita: databank.worldbank.org/data/download/site-content/CLASS.xls

^[3] Forouzanfar et al. JAMA. 2017;317(2):165-182. doi:10.1001/jama.2016.19043

^[4] Roth et al. J Am Coll Cardiol. 2017 May 15. pii: S0735-1097(17)37244-3.

^[5] WHO Global report on diabetes: <http://www.who.int/diabetes/global-report/en/>

^[6] For instance: cost and financing of the intervention, provider training, availability of resources, integration into healthcare systems, delivery to vulnerable or difficult-to-reach populations, monitoring the quality of intervention delivery

^[7] For instance: behavioural interventions; prevention, early detection, diagnostic, treatment and disease management interventions; quality improvement programmes

^[8] <https://sustainabledevelopment.un.org/sdg3>

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| 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: | Strategic collaboration in health research and innovation between EU and China |
| Topic Identifier: | SC1-HCO-11-2018 |
| Type of Action: | CSA Coordination and support action |
| Deadline(s): | 18-04-2018 (single-stage) |

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/sc1-hco-11-2018.html>

Specific Challenges: Compared to its size and increasing weight on the R&I international scene, **China's** participation and cooperation to the Horizon 2020 SC1 programmes is low. This is a lost opportunity because most of the major health challenges are global, and cooperation with **China** on specific strategic health challenges can contribute to provide more evidence-based solutions and to avoid duplication.

Scope: The objective of this action is to support networking between European and **Chinese** policy makers, programme owners and funders, with the following goals:

1. To develop a sustainable platform between EU and **China** that will facilitate a constant dialogue on addressing common health R&I challenges.
2. To identify health challenges, whose solution may benefit from closer bi-lateral and/or multi-lateral cooperation between EU and **China**, to facilitate and develop collaborative research initiatives between EU and **Chinese** stakeholders.

The Commission considers that a proposal requesting an EU contribution between EUR 0.8 and 1 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

- Increased bi-lateral and multi-lateral cooperation on health research strategic items between EU and **China**.
- Higher participation of **Chinese** researchers in SC1 and future EU health research programmes, but also of European researchers in **Chinese** health research programmes.

Cross-cutting Priorities: International cooperation

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| Horizon 2020 Pillar: | Societal Challenges |
| Programme: | Health, demographic change and wellbeing |
| Call Title: | Digital transformation in Health and Care |
| Call Identifier: | h2020-sc1-dth-2018-2020 |
| Topic Title: | Support to further development of international cooperation in digital transformation of health and care |
| Topic Identifier: | SC1-HCC-03-2018 |
| Type of Action: | CSA Coordination and support action |
| Deadline(s): | 24-04-2018 (single-stage) |

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/sc1-hcc-03-2018.html>

Specific Challenges: Citizens in ageing populations wish to stay in their homes for as long as possible. They are however at risk of age related impairments such as poor health, cognitive impairment, frailty and social exclusion with considerable negative consequences for their independence, quality of life, that of those who care for them, and for the sustainability of health and care systems.

There is an increasing global interest in cooperation on research and innovation addressing this issue with digital solutions and services. It is however necessary to identify the future areas for international cooperation which have the highest potential as well as support the identification and networking of the potential funding organisations which can promote future cooperation. In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged, in particular with the US, Canada, Japan, South Korea and **China**.

Scope: The action should develop and deliver a roadmap for international cooperation which outlines key relevant research and innovation areas in digital solutions and services for active and healthy ageing. The selection of topics and potential funding schemes should be based on a clear methodology which also takes into account the European added value and identifies relevant existing and emerging initiatives which can form the basis for such a cooperation. The action should also ensure that relevant stakeholders are engaged during the process through regional and international workshops and a set of communication and dissemination actions.

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

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

- Increased awareness of relevant research and innovation initiatives by European and International stakeholders;
- Increased international cooperation in research and innovation on ICT for active and healthy ageing through a roadmap of priority areas and potential funding schemes;
- Increased networking of European and international stakeholders interested in international cooperation in the field;
- Improve competitiveness of European industry by opening up international open innovation possibilities and gaining access to future markets.

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

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| 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: | Actions in support of the International Consortium for Personalised Medicine |
| Topic Identifier: | SC1-HCO-01-2018-2019-2020 |
| 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-01-2018-2019-2020.html>

Specific Challenges: Personalised Medicine is a very broad and multifaceted area where success relies on a well-functioning collaboration between several disciplines and different actors. While great advances have been made in some fields of medicine, in particular in stratification of cancer patients and in addressing rare diseases, most of today's healthcare protocols do not include personalised approaches apart from occasional division into broad age groups (children/adults/elderly), sex or ethnicity. Furthermore the prevention aspect of personalised medicine, i.e. identifying individuals prone to develop certain diseases, is largely isolated from treatment options. As is the case for a relatively nascent field there is a need for standardisation of approaches, including for sampling, data storage, interpretation and data exchange and also for clinical trials design and reimbursement models. European countries with their social model of healthcare along with (in several cases) centralised cost reimbursement, are ideally placed to lead the way for an integrated health management system. Many needs for coordination and support activities have been identified by ICPeMed^[1], which includes representatives from most EU countries along with several other European countries and Canada. Also the wider internationalisation of ICPeMed can be underpinned by coordinating networking activities with third countries.

Scope:

The action should focus on the following field:

International aspect

The action should focus on building links with third countries by analysing the potential and advantages of collaboration in personalised medicine (PM) with those countries, studying areas of interest for Europe in PM collaboration and promoting international standards in the field. In particular the uptake of personalised approaches in health systems and healthcare should be addressed, taking into account social and cultural aspects, health economy issues and equitable healthcare. For the 2018 call, the project should focus on CELAC^[2] as a group of countries, and for the 2019 call on **China**. Due to the specific challenge of this topic, in addition to the minimum number of participants set out in the General Annexes, proposals shall include at least one participant from the international partner region CELAC or from **China**, respectively.

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

The Commission considers that proposals requesting a contribution from the EU of between EUR 1.5 and 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

Contributing to the implementation and reach of the ICPeMed initiative; furthermore:

International aspect: Integrating the country/group of countries into ICPeMed activities. Support wider adoption of standards developed in Europe. Contribute towards the UN Sustainable Development Goal 3: Ensure healthy lives and promote well-being for all at all ages.

Delegation Exception Footnote: This topic will continue in 2020

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

^[1]International Consortium for Personalised Medicine; <http://icpermed.eu>

^[2]Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Grenada, Guyana, Jamaica, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Saint Lucia, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay, Venezuela

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| 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): | 13-02-2018 (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: International cooperation, Open Innovation, Clean Energy, RRI, Socio-economic science and humanities

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| 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: International cooperation, Open Innovation, Clean Energy, RRI, Socio-economic science and humanities

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|-----------------------------|--|
| 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: | Harnessing and understanding the impacts of changes in urban mobility on policy making by city-led innovation for sustainable urban mobility |
| Topic Identifier: | LC-MG-1-3-2018 |
| Type of Action: | RIA Research and Innovation action |
| Deadline(s): | 30-01-2018,19-09-2018 (two-stage) |

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/lc-mg-1-3-2018.html>

Specific Challenges: Urban mobility is in transition. This is a result of, for example, changing user needs; emerging transport technologies; new transport services using new business models; and new institutional and financing structures. Greater data availability provides new opportunities for evidence-based policy and policymakers aim at an ever-increasing integration of urban mobility policy with other sectorial policies. The impacts of this change will go far beyond the transport sector and influence other sectors that are transport-reliant.

The policy impacts, individually and in combination, of new solutions, which are at different levels of maturity, are not clear yet. There are many open questions about how policymakers should react and how Sustainable Urban Mobility Plans (SUMP), and other sectorial policies that affect urban mobility, should respond and adapt to these potential disruptive changes. Therefore, research is necessary to improve the understanding of the impacts of new urban mobility solutions on policy making.

This topic covers passenger transport and freight transport. It covers urban and peri-urban areas. Special attention should be paid to the needs of vulnerable groups and users with different cultural backgrounds taking into account gender issues; and to the specific context of areas that are undergoing rapid economic change.

Scope: This topic will be implemented through two sub-topics with different types of actions: Proposals should address the following:

a. Research and innovation actions:

This sub-topic asks to examine the impacts of new mobility solutions, addressing the changing mobility patterns and set up of mobility services, including possible negative effects, and covers all relevant transport modes (including active modes) and vehicle types. City-led proposals should address one or more of the following aspects:

- investments in and management of the transport network, with attention for facilities for recharging; transport system resilience; and transport demand management tools (such as pricing; low emission zones; parking management; one way traffic);
- the specific challenges in areas undergoing rapid economic change, for example in institutional setup; policy coherence; policymakers mind-set; outdated or incomplete legislation/methodologies; and data/statistics;
- new operating and business models in collective public and private transport;
- pathways to tackling congestion and reducing levels of car use through decoupling economic growth and high mobility from traffic growth;
- implications for and interaction with urban planning and design including inputs for developing SUMP.

Proposals should incorporate new data-driven planning approaches.

The actions will also deliver at least three validated test cases (small pilot projects with quantified objectives in which public stakeholders and economic actors participate) that take into account different political and socio-economic contexts. The active participation of a small number of representatives from authorities of small and medium-sized cities in proposals should be ensured.

In line with the Union's strategy for international cooperation in research and innovation^[1] international cooperation is encouraged, especially with the USA, **China** and India

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 to 4 million each for Research and Innovation actions, and of up to EUR 3 million for the Coordination and Support Action, could address this specific challenge appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: Proposals addressing sub-topic A) above, will produce new, practice-based knowledge on how to navigate urban mobility policy through transition taking into account legacy systems and the need to integrate new solutions that are at different levels of maturity. They will provide added-value inputs and contribute to evidence-based policy making at local, regional, national and EU levels. Proposals should demonstrate how their work will support effectively mobility policies in the cities' efforts to follow a viable transformation path towards sustainable mobility.

The results of the actions will feed into future EU initiatives, for example on Sustainable Urban Mobility Planning (SUMP); cooperative-ITS; travel and traffic information; low-emission logistics; and future infrastructure networks, including links to the TEN-T and can help improve Air Quality Plans.

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

^[1] COM(2012)497

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|-----------------------------|---|
| 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 reduction of transport impact on air quality |
| Topic Identifier: | LC-MG-1-1-2018 |
| Type of Action: | RIA Research and Innovation action |
| Deadline(s): | 30-01-2018, 19-09-2018 (two-stage) |

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/lc-mg-1-1-2018.html>

Specific Challenges: The air quality situation in Europe has not sufficiently improved for some pollutants and significant exceedances are still found, for example, for particles, ozone and nitrogen oxides, particularly in areas affected by specific environmental or industrial conditions.. Similar situations occur in many cities around the world, and this is the reason for designing this international cooperation flagship.

High hopes are pinned on zero tailpipe emission technologies that might solve the problem in the longer term, particularly in the road sector. However, fleet renewal is too slow to just wait for all vehicles on the road to be replaced by electrified ones in order to solve the air quality issue. Also, emissions from other sectors, such as ships and aircraft in ports, internal waterways and airports, can contribute significantly to the problem, and zero emission technologies are not often available.

It is therefore urgent to address in as many ways as possible the reduction of the impact of the existing internal combustion transport fleets and support local authorities and other regulatory bodies with the provision of appropriate/advanced tools. Monitoring of the car fleet, for instance, can detect high emitters, allowing to provide information to authorities for possible cases of defeat devices, tampering, poor durability of depollution systems.

In the case of tampering, the legal situation varies among member states and needs to be clarified in view of facilitating enforcement.

The choices of customers buying new vehicles can be oriented towards cleaner vehicles by making visible which are those that have an overall better performance (i.e. as a consumer information measure, separate from EU

certified type-approval testing, while users of existing polluting vehicles could be encouraged to use them in a more environmentally friendly way.

It is also important to verify the performance of On Board Detection (OBD) systems and of periodic inspections and improve them where appropriate.

On board measurement of pollutants could enable new implementation approaches to regulation showing on the one hand how much each driver pollutes (helping in the eco-driving effort) whilst on the other hand allowing a real "polluter pays" approach to certification, taxation and traffic regulation (the needed technology will be explored in LC-MG-1-4-2018, together with research on hardening de-pollution systems against tampering).

Apart from road vehicles, airports and ports can strongly contribute to poor air quality, it is therefore important to quantify their impact and monitor their evolution.

Finally, the health impact of extremely fine particles and of Volatile and Semi-Volatile Organic Compounds (VOCs and SVOCs free or absorbed in the particles), is still not well understood. Such ultra-fine particles have been proven to pass the alveoli, placental and brain barriers and they can reach other organs through the blood stream and generate serious health impacts which need further research.

Scope: Given the policy relevance of the topic, the selected consortia will regularly share their findings with relevant European Commission services. Proposals will have to address one of the following subtopics and clearly indicate which subtopic they are addressing:

- a. Low-emission oriented driving, management and assistance. This area aims at exploring the impact of the user (including his driving behaviour and choices in maintaining the vehicle) on emission production:
 - Driving behaviour exploration: PEMS^[1] driving measurement campaigns to assess driver behaviour variability and correlate it with real powertrain emission, and (if needed by lab measurement and modelling) brakes and road/tires emissions;
 - Derivation of low polluting-emissions driving practices and dissemination through awareness campaigns. The collected data should be of adequate quality to be also usable as input for future implementation in driving assistance tools and automated driving, as well as traffic management;
 - Assessment of the impact of other user behaviours such as poor maintenance or tampering. All aspects and causes should be studied, including an assessment of the real effectiveness of OBD and periodic inspections, of the legal situation of tampering in each member state (for both sales of devices and installation) and of the most effective ways to induce car owners not to tamper and to properly maintain their vehicles (considering both technical and economic reasons for their behaviour);

- Assessment of the potential impact of retrofits^[2], both for light and heavy duty road vehicles and NRMM^[3] (including the development of methodologies to verify a level of durability appropriate for the application) and promotion of their application in cities with pollution problems.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497) international cooperation is encouraged, in particular with **China** and other **Asian** and/or CELAC countries.

- b. Starting from recently defined emissions indicators (RDE test results including NOx max and PN max values, WLTP CO2 emissions), development of a 12 to 18 month project to timely develop support to informed consumer choice by defining a holistic testing and scoring mechanism. This should be capable of assessing all vehicles (conventional and electrified) and lead to a single "GREEN VEHICLE index". Such index should encompass all of the relevant criteria, e.g. tailpipe CO2, and polluting emissions such as NOx/NO2, hydrocarbons and particles, noise, performance and operating cost. The developed methodology should be fine-tuned in a pilot phase on a sufficiently large number of vehicles to ensure that the results are comparable and provide a fair and reliable assessment. Such an index could result in a public awareness scheme (running after project end) capable of orienting eco-conscious consumer choice, and to create a virtuous circle (as achieved by EURONCAP for safety) creating competition on who brings to market the cleanest vehicles. The mechanism should complement (not overlap with) the results of regulatory real-driving emissions (RDE) tests with an aim to maximise the coverage of real-world driving situations and provide relevant information. Particular attention should be paid to the ways in which the variability of real-world emissions performance is communicated, and what usage patterns deliver the best performance (being therefore complementary to the study and awareness raising activities in Subtopic A).
- c. Sensing and monitoring emission in urban road transportation system. This area intends to urgently provide a means to monitor fleet-wide on-road emissions, to detect and repress any emission-affecting modifications of individual vehicles (tampering) or bad maintenance/poor after-treatment system durability/OBD ineffectiveness, to support local air quality plans, and to help national and local enforcement authorities in identifying and prosecuting infringing vehicles.
 - Remote sensing of road vehicle emissions (contactless measurements from the roadside, portals or from chasing vehicles); further technological development of available techniques is needed to improve performance, reduce costs, facilitate use by unskilled personnel and achieve a broader deployment potential;

- Establishment of a proper data infrastructure built around vehicle registration databases, traffic management measures and air quality monitoring systems;
- Demonstration of the system in several cities;

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

- d. Cost effective enforcement of shipping related emissions legislation, both at the EU and global level, is essential for the expected environmental improvements to be achieved. To support the enforcement, assess their effectiveness and to identify potential future gaps it is necessary to develop, evaluate and demonstrate cost effective systems to measure the airborne emissions of pollutants from a vessel under real operational conditions (e.g using on board systems) and to target ships for inspection and the enforcement of emission limits.

For coastal, urban and port areas, develop measuring technologies and 'beyond state of the art' modelling tools to assess the contribution of air emissions from ships and their comparative impact on air quality and health building also on projects such as 'Interreg Clean North Sea Shipping (CNSS) and the LIFE project 'Clean Inland Shipping' (CLINSH).

In addition to characterising and quantifying particulate matter (in particular, the most harmful, including ultrafine), such systems should also be able to simultaneously measure other relevant pollutants including SO_x and NO_x.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged, in particular with the involvement of the largest ports and regulating authorities and other relevant bodies within the **Asian** region as well as in the frame of the activities of the International Maritime Organisation to which EU Member States and global maritime nations are parties.

- e. Measurement of airborne pollutants emissions from aircraft under parking (with functioning APU), taxiing, take-off and climb-out conditions and under different climate conditions (In addition to characterising and quantifying particulate matter down to at least 10nm, systems should also be able to simultaneously measure other relevant pollutants including SO_x and NO_x). An assessment of pollutants' transport and impact on air quality in and around airports, in a form potentially suitable for regulation should be performed.

In line with the Union's strategy for international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged, in particular with **Asia**, CELAC and the US.

- f. In-vitro and in-vivo assessment of health effects of ultrafine nanoparticles (VOCs and SVOCs) emitted from engines of the different transport modes

particularly when using fuels with high aromatic content. Focus should be on understanding the biological processes leading to acute genotoxic and systemic effects in the lungs and, in particular, beyond.

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

Expected Impact: All the above actions contribute to the UN's Sustainable Development Goals (SDG), in particular SDG 3 ("Ensure healthy lives and promote wellbeing for all at all ages") and 11 ("Make cities and human settlements inclusive, safe, resilient and sustainable") through:

- Reduction of emissions from the existing combustion-engined car fleet (A, C);
- Reduction of unnecessary driver-induced emissions through a better awareness by the public of their role in controlling polluting emissions (A) ;
- Increase of low emitting vehicle sales by providing more information to guide buyers towards the cleanest available vehicles (B);
- Reduction of transport-related emissions through the improvements of detection and enforcement against vehicles with tampering, defeat devices or durability issue, as well as of ships not complying with emissions regulations, i.e. not using clean low-sulphur fuels, suitable engine parameters for NOx reduction or properly activating de-pollution devices where appropriate (C, D) ;
- Better understanding of the impact of the different transport modes through monitoring detection and modelling of emissions in the existing road vehicle fleet as well as ships and aircraft (C, D, E) ;
- Improved and more comprehensive data for risk assessment from air pollutants from different transport modes and identification of cost effective reduction measures (F);
- Provide technical evidence to assess gaps in current regulation of vehicles and air quality (All).

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

^[1] Portable Emissions Measurement Systems

^[2] For instance those resulting from the Horizon Prize for the cleanest engine retrofit.

^[3] Non-Road Mobile Machinery, i.e. earth moving machines, locomotives etc).

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| 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: | Harnessing and understanding the impacts of changes in urban mobility on policy making by city-led innovation for sustainable urban mobility |
| Topic Identifier: | LC-MG-1-3-2018 |
| Type of Action: | CSA Coordination and support action |
| Deadline(s): | 04-04-2018 (single-stage) |

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/lc-mg-1-3-2018.html>

Specific Challenges: Urban mobility is in transition. This is a result of, for example, changing user needs; emerging transport technologies; new transport services using new business models; and new institutional and financing structures. Greater data availability provides new opportunities for evidence-based policy and policymakers aim at an ever-increasing integration of urban mobility policy with other sectorial policies. The impacts of this change will go far beyond the transport sector and influence other sectors that are transport-reliant.

The policy impacts, individually and in combination, of new solutions, which are at different levels of maturity, are not clear yet. There are many open questions about how policymakers should react and how Sustainable Urban Mobility Plans (SUMP), and other sectorial policies that affect urban mobility, should respond and adapt to these potential disruptive changes. Therefore, research is necessary to improve the understanding of the impacts of new urban mobility solutions on policy making.

This topic covers passenger transport and freight transport. It covers urban and peri-urban areas. Special attention should be paid to the needs of vulnerable groups and users with different cultural backgrounds taking into account gender issues; and to the specific context of areas that are undergoing rapid economic change.

Scope: This topic will be implemented through two sub-topics with different types of actions: Proposals should address the following:

b. Coordination and support actions:

This sub-topic addresses the facilitation of knowledge exploitation and support to the cooperation between projects and stakeholders involved in the projects under the first sub-topic, and from across CIVITAS 2020. This Coordination and Support Action should also consolidate the common ‘CIVITAS Process and Impact Evaluation Framework’ and ensure the continuity of a ‘CIVITAS Secretariat’ as well as financing of CIVINets.

Proposals should present innovative approaches for all of the following needs:

- local capacity building and training in deploying innovative mobility solutions;
- networking cities and engaging with stakeholders working at the local level, overcoming language and contextual barriers;
- reinforcing the involvement of the CIVITAS cities from different CIVITAS-Phases in the CIVITAS network;
- partnering with industry and civil society in navigating through transition and change;
- implementing a communication and dissemination strategy with high impact actions.

In order to maximise impacts, and in the context of CIVITAS 2020, all projects funded under this topic and other relevant topics (for example dealing with SUMP) shall work together and exchange information and practical experiences

In line with the Union’s strategy for international cooperation in research and innovation^[1] international cooperation is encouraged, especially with the USA, **China** and India

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 to 4 million each for Research and Innovation actions, and of up to EUR 3 million for the Coordination and Support Action, could address this specific challenge appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: Proposals addressing sub-topic B) will help to promote the take up of innovation that leads to more effective and efficient transition of urban mobility systems by strengthening the mechanisms for urban mobility policy making and planning. A ‘CIVITAS Secretariat’ will be continued. Capacity building; engaging; partnering; and communication and dissemination actions will aim at a maximum impacts and reach of target audiences.

This results in a developing knowledge-base, technical capacity, harmonised evaluation activities, and support for up-scaling and knowledge transfer which is available to cities and other interested parties. Clear commitments and contribution from the action's participants to Europe-wide take up are expected. The Coordination and Support Action must ensure both

continuation of CIVITAS support activities and also support for future CIVITAS-type actions.

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

^[1] COM(2012)497

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| 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)

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| 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: | Aviation operations impact on climate change (InCo flagship) |
| Topic Identifier: | LC-MG-1-6-2019 |
| Type of Action: | RIA Research and Innovation action |
| Deadline(s): | 24-04-2019 (single-stage) |

Participant Portal Weblink:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/lc-mg-1-6-2019.html>

Specific Challenges: This action is part of the Aviation International Cooperation Flagship called "Safer and Greener Aviation in a Smaller World" mentioned in the introduction to this work programme 2018-2020.

Aviation alters the composition of the atmosphere globally, thus can potentially contribute to anthropogenic climate change and ozone depletion. The last major international assessment of these impacts was made by the Intergovernmental Panel on Climate Change (IPCC) in 1999. In addition to CO₂, the climate impact of aviation is strongly influenced by non-CO₂ emissions, such as nitrogen oxides, influencing ozone and methane, and water vapour, which can lead to the formation of persistent contrails in ice-supersaturated regions.

Beyond the perennial challenge in developing new technologies that can minimize the impact in the medium and longer term, the main objective of this action is expected to address mitigation strategies that will minimise those negative effects by aviation on climate in the short-medium term and are relevant for greener flight trajectories and operations.

Scope: The proposals may aim at one or more of the following areas:

- a. Advance further the international state-of-the-art, through better scientific understanding of aviation emissions with high degree of uncertainty and high estimated impact to climate change, in order to enable greener flight operations.
- b. Propose and evaluate mitigation strategies towards operational improvements.

- c. Propose and evaluate mitigation strategies towards greener flight trajectories (ensuring complementarities with SESAR JU activities).
- d. Propose and evaluate mitigation strategies based on the use of alternative jet fuel pathways that have been approved under or intended to apply for the ASTM D7566 approval standard. A detailed Life Cycle Analysis (LCA) approach needs to be included taking into account the following key elements: proper co-product allocation methodology, system boundaries, attributional vs consequential LCA and uncertainties from the time horizon, the potential of Green House Gases (GHGs) reduction and economic implications. Regarding the feedstocks, the impact of indirect land-use change (ILUC) on GHGs emissions must also be taken into account and addressed.

Proposals are expected to address the need to design and implement international measurement campaigns, in order to contribute to better climate metric assessments and more reliable physical and climate models.

This action does not address new aircraft technologies on structures, systems, engines nor their integration, towards minimising the impact in the medium and longer term. The projects are expected to formulate specific recommendations for stakeholders on flight planning and on the use of alternative fuels.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged. In particular bilateral international cooperation with **China** is encouraged for areas C and D with the aim at promoting substantial coordinated and balanced research and innovation cooperation between the EU and **China**. Proposals under those research areas C and D are encouraged to have an appropriate balance in terms of effort and/or number of partners between the EU and **China**. **China**-based participants have the possibility to apply for funding under the **Chinese** co-funding mechanism and other **Chinese** sources.

Although the association of TRL to better understanding aviation emissions is not uniquely defined, the implementation of the proposed topic may cover TRL spectrum from 2 to 4.

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

Expected Impact: The topic aims to deliver scientifically founded and globally harmonised policy, regulations and operational improvements to support climate-friendly flight operations. Expected impacts are:

- Better understanding the impact of aircraft emissions on climate towards better policy.
- International measurement campaigns and international validation of physical and climate models.

- Operational improvements in support to achieve the collective medium term global aspirational goal of keeping the global net CO2 emissions from international aviation from 2020 at the same level (so-called "carbon neutral growth from 2020").
- Enhanced role of the Union in International Organisations and multilateral fora as well as strengthened implementation, governance, monitoring and evaluation.
- Collaboration and sharing expertise on operational improvements and global market-based measures with EU and National aviation and environment research programmes.
- Contribution to UN's Sustainable Development Goal 13: Take urgent action to combat climate change and its impacts.

Cross-cutting Priorities: International cooperation

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| 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): | 24-04-2019 (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 in Europe, **Asia**, African and/or CELAC countries: 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). Comparative demonstrations activities and pilots (in European and **Chinese's** Cities, African, CELAC countries) of such jointly designed concepts developed by local partners.
- 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

- 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.

Applicants are invited to read the eligibility and admissibility conditions for this topic.

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)
- 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, Contractual Public-Private Partnerships (cPPPs), EGVI, International cooperation, Socio-economic science and humanities

^[1] (COM (2012) 497)