

Scoping Paper for
Horizon 2020 work programme 2018-2020
Societal Challenge 4: Smart, Green and Integrated Transport

Important Notice: Working Document

This scoping paper will guide the preparation of the work programme itself. It is a working document not formally endorsed by the Commission, and its content does not in any way prejudge the final decision of the Commission on the work programme.

The adoption and the publication of the work programme by the Commission are expected in October 2017. Only the adopted work programme will have legal value.

Scoping paper for the Horizon 2020 work programme 2018-2020

Societal Challenge 4: Smart, Green and Integrated Transport

1. Context

The Scoping Paper on the Societal Challenge ‘Smart, Green and Integrated Transport’ is part of the Strategic Programming of the 2018-2020 Work Programme. It summarises the main priorities in the transport area linked to major EU policy initiatives and takes into account the complementarities with other parts of Horizon 2020. It proposes a structure of calls, indicating possible focus areas and cross-cutting activities.

The Scoping Paper takes into account: 1) the Horizon 2020 Specific Programme, as the reference for defining the content of the Work Programmes; 2) the main EU policy priorities; 3) the analysis of the coverage of the previous Work Programmes; 4) the consultation with the Transport Advisory Group and the broader group of stakeholders.

In addition, many other relevant policy documents affecting the definition of priorities for Transport research and innovation have been analysed and taken into consideration, including the conclusions of the Paris Agreement adopted at COP 21 and the UN 2030 Agenda for Sustainable Development.

Policy priorities

The Juncker Commission has set out ten policy areas¹ on which the EU needs to focus its efforts over the next years. Research and innovation represent major drivers to both stimulate and leverage investment providing new solutions and knowledge helping to deliver the new Commission’s agenda.

The 2018-2020 Work Programme of Horizon 2020 contributes to the Commission's priorities and in particular to:

- Jobs, Growth and Investment,
- Digital Single Market,
- Energy Union and Climate,
- A Stronger Global Actor.

At the same time, it will also help to deliver the Commissioner Moedas agenda for 'Open Innovation, Open Science and Open to the World'.

Gap analysis

A gap analysis has been conducted to identify whether elements of the Specific Programme (Transport part) remained uncovered after the first two Work Programmes covering 2014-2017². The analysis revealed that all twelve specific activities mentioned in the Specific Programme have already been covered to varying degrees and therefore there are no particular limitations linked to uncovered areas. The gap analysis also indicates that during the first

¹ http://ec.europa.eu/priorities/index_en.htm

² Calls 'Mobility for Growth' and 'Green Vehicles' of the work programme 2014-2015 and 'Mobility for Growth', 'Automated Road Transport' and 'Green Vehicles' of the work programme 2016-2017

Work Programmes there has been satisfactory share of funding directed to main cross-cutting issues, such as climate change, sustainable development and social sciences and humanities.

Transport Advisory Group and stakeholder consultation

The Transport Advisory Group (TAG) submitted its report in May 2016 pointing out the relevance of both the content of the previous Work Programmes and the priority challenges identified in the first TAG report in 2014. They stressed the need to continue with a disruptive rather than incremental approach in order to respond rapidly to shifting transport paradigms with new revolutionary technologies, business environment and mobility patterns. In addition, the TAG identified a number of new elements, which emerged since 2014, e.g.:

- a) The positive impact of the COP21 agreements providing the transport sector with a clear agenda and mandate.
- b) A slow growth world with uncertain perspective contributing to accumulated delayed maintenance of infrastructure and mass transit systems, with negative impacts on accessibility, congestion, safety and the overall efficiency of transport systems.
- c) Security threats targeting Europe and its logistic and strategic centres as well as increasing climate change and weather phenomena risks call for new approaches towards preparedness and resilience, particularly of major transportation nodes and mass transport systems.
- d) Lower oil prices affect many economic drivers and while it has a major positive impact on air transport and the auto industry, it weighs on alternative fuel research and development, leading to unwanted delays in the transition towards a carbon-free economy.
- e) Large-scale migration flows impact border management, hamper mobility, increase costs, lower accessibility and accentuate regional differences.

Furthermore, the TAG pointed out that research and innovation will need to consider the complexities emerging from the differences in the speed of innovation across the transport system. Business models may change rapidly when new opportunities emerge with digitisation, and when potential new actors enter from other non-transport sectors. The speed of many of the recent changes in the transport business is unprecedented in the sector.

In this context, the Transport Advisory Group outlined in its report 16 potential priority research areas which have been used as a key input for the strategic orientations for 2018-2020.

The stakeholder consultation³ pointed to similar concerns and identified critical issues such as:

- Climate change and the need to mitigate its effects, notably through a tighter integration of the energy, transport and climate challenges

³ Approximately 40 organisations from all transport modes, including research organisations, industry associations, public bodies and users or transport as well as citizens associations, participated in the stakeholder consultation from 23/3/2016- 11/5/2016.

- The decarbonisation of transport, notably through research activities geared towards reducing the dependence of transport on fossil fuels
- Safety and security under different perspectives, including the opportunities and threats posed by automation
- Resilience of the transport system, addressing external hazards and vulnerability to new threats
- Digitisation, automation and general support for disruptive technologies
- Sustainable mobility, including, for the urban dimension, the integration of sustainable modes in traffic/network management
- Environment and health, also in terms of investigating the potential of behavioural change and shift in favour of active travel
- Governance and regulation, with new insights needed into the impacts of wider technology developments, notably connected to automation and big data

2. Strategic orientations for 2018-2020 and translation into calls

2.1 Strategic orientations

The strategic orientation on societal relevance has been applied to transport research funding throughout Horizon 2020. This approach will be deepened further in 2018-2020 so that the technology oriented research and innovation can be increasingly complemented with a strong focus on user needs, societal issues and regulatory framework. Furthermore, the strategic orientations for 2018-2020 take into account the priorities of the EU transport research and innovation policy, which promote an integrated innovation strategy aiming delivering on decarbonisation, digitisation and human-centred transport system.

In this context, the following four strategic orientations for transport research have been identified for the next Work Programme:

- Towards an integrated, sustainable and robust transport system;
- Technologies transforming the transport system;
- Global leadership, competitiveness, business models and markets;
- Accounting for the people: demand, needs and behaviours; inclusion and access.

I. Towards an integrated, sustainable and robust transport system

The overall performance of the transport system depends on the performance of infrastructure, means of transport, traffic management systems and on user behaviour and acceptance. This includes motorised road and rail vehicles, aircraft and vessels and their respective infrastructures, but also active modes like cycling and walking, particularly in urban areas. Further knowledge is needed both on new mobility concepts (sharing economy, mobility as a service, drones applications, etc) and the door-to-door integration of different modes for short and long distance travel in both the passenger and the freight transport. The incorporation of economic, social and environmental dimensions is important in order to improve the current transport system, increase its robustness and resilience against man-made and natural disasters and support affordability, safety, security and quality of life. It is also essential to consider aspects of accessibility and integration of new mobility solutions. Research and innovation should be directed towards:

- Integrated door to door mobility for passengers and freight, including new mobility concepts and services.
- More efficient and effective deployment and maintenance of assets, infrastructure and traffic management.
- Enhancing safety for users in all transport modes.
- Improving health and the environment moving towards pollution and emission-free, low-noise transport and mobility solutions, with a particular emphasis on clean urban public transport.
- Increasing the transport system's resilience and security.

II. Technologies transforming the transport system

Technological innovations in means of transport and propulsion systems remain very important for the improvement of the transport system performance, both in terms of efficiency as well as in terms of environmental and climate change concerns. They can make a major contribution to the decarbonisation and digitisation agenda of the sector. At the same time, technologies developed in other areas and new materials are increasingly relevant to the transport sector and can contribute to its successful and sustainable transformation. Research should therefore integrate developments across modes, systems, disciplines and strict technological boundaries, aiming to:

- Accelerate decarbonisation of the transport system through energy efficiency and better alternative fuels in all transport modes and support the shift of transport towards environmentally friendly solutions pursuing a “zero-emission” vision.
- Advance electromobility, including vehicle safety, charging, energy harvesting, linking in with the electricity grid, storage and improved battery/supercapacitors performance for clean and competitive transport.
- Advance technologies for automation, connectivity and digitisation for more efficient and safer transport in all application domains, making use of the European Global Navigation Satellite Systems (Galileo and EGNOS) where relevant, and paying particular attention to security and cybersecurity concerns and technical vulnerability.
- Development of radical new transport technologies

III. Global leadership, competitiveness, business models and markets

Competitiveness strongly relies on technological developments, but also increasingly depends on suitable legal, social and organizational framework conditions, including cooperation frameworks. Synergies on collaborative design and processes as well as manufacturing methods and supply chains in all transport modes should enable innovation breakthroughs that will keep the European industry, including SME, competitive in the decades to come. To create new markets and better respond to societal needs, research in new mobility concepts that integrate products and services can lead to the emergence of new innovative solutions and business models. Further knowledge is needed to support innovation-friendly standards, regulation and framework conditions that allow the emergence of successful new business and operating models. The provision and use of big data has a significant potential for the optimisation of passenger and freight transport but further knowledge is needed in the areas of

governance, security and data quality, availability and privacy. Research should be directed towards:

- Increasing the competitiveness and leadership of the EU transport products, production systems and services on EU and global markets.
- Creating framework conditions that allow for new business and operating models, mobility patterns and technologies.
- Availability, protection/privacy and use of big data, also as a platform for new mobility business and operating models.

IV. Accounting for the people : demand, needs and behaviours; inclusion and access

New technologies and solutions will only succeed if they address the evolving needs of potential users and our society at large and are consequently met with wide acceptance. Elaborating effective policies for the deployment of inclusive and accessible transport and mobility relies strongly on the capability to evaluate, monitor and assess the impact (economic, environmental, social, cultural) of new mobility solutions. This requires a robust and comprehensive set of information, tools and techniques.

The aspirations, needs and preferences of users evolve at a growing pace as the result of fast technological advancements, changing socio-economic paradigms and financial constraints and render established technical and organisational solutions obsolete. Therefore, state-of-the-art knowledge of the factors which shape future mobility demand and acceptance of innovations is important. Several aspects need to be considered in this context, such as the role of main demographic trends, the need for inclusiveness and affordability, the economic and spatial dimensions of transport systems, gender-related differences, cultural diversity across Europe including the impact of growing migration as well as possible new learning needs. Research should be directed towards:

- Better understanding and anticipating the dynamics of mobility and transport demand, accounting for all citizens, industry and commerce.
- Updating and enhancing the knowledge toolbox (datasets, models, foresight, indicators, new tools, etc) for the impact assessment of mobility solutions and policies.

Expected impact

The actions responding to these priorities will contribute to making the European transport and mobility system more efficient, sustainable, safe, secure and competitive, in line with the objectives of the Transport White Paper, as well as those of other policy initiatives, such as the recent Commission communication on "a European Strategy for Low-Emission Mobility"⁴ and the forthcoming communication on 'Accelerating Clean Energy Innovation' and the Strategic Transport Research and Innovation Agenda. They support the development of new technologies, business and operations models, but will also take stronger account of the demand-side of European transport, including people's needs and behaviour and company logistics.

Expected concrete objectives/outputs will be part of the relevant sections of the specific research topics in the Work Programme. Some of these outputs will be evolutionary,

⁴ COM(2016) 501 final - 20.7.2016

representing improvements to existing technologies, systems and practices, while others will be more revolutionary, offering a step-change in performance or disruptive solutions having the potential to create new markets. Many of these outputs will pave the way for successive deployment in areas supported by other EU instruments such as Connecting Europe Facility, European Structural and Investment Funds, European Fund for Strategic Investment.

2.2. Translation into calls

The 2018-2020 Work Programme will take account of and will be coordinated with other actions funded by the Societal Challenge 'Smart, Green and Integrated Transport', outside this Work Programme such as the actions under Clean Sky 2, SESAR 2020, Shift2Rail and Fuel Cells and Hydrogen 2 Joint Undertakings.

Actions meeting the above-identified priorities will be the subject of the following focus areas and calls:

- **Call 'Mobility for Growth'**

This call will cross-cut the transport part of the 2018-2020 Work Programme on the priorities identified for 2018-2020, with the exception of those that will be addressed by the calls linked to the focus areas. One of the major goals will be the integration of the different dimensions of transport, including behavioural aspects and the new mobility concepts, such as mobility as a service, responding to the maximum possible extent to the user needs.

- **Calls linked with focus areas**

For the last three years of its implementation, Horizon 2020 will aim to focus its activities in a limited number of large focus areas linked with main policy priorities and objectives. Transport research and innovation actions will contribute to and establish synergies in particular with the cross-cutting focus areas of "Building a low-carbon, climate resilient future" and "Digitising and transforming European industry and services". The 2018-2020 transport part of the Work Programme will therefore include a dedicated call for each of these two focus areas.

The call linked to the focus area "Building a low-carbon, climate resilient future" will include relevant activities, such as those of the European Green Vehicles Initiative contractual Public-Private Partnership which aim at accelerating research, development and demonstration of technologies for clean engines and vehicles based on alternative energies in road transport. The call linked to "Digitising and transforming European industry and services" will include activities related to Automated Road Transport as well as other relevant activities.

Synergies with other parts and cross-cutting issues

The Transport challenge will continue to contribute to the activities under Blue Growth. It will also create synergies with other parts of Horizon 2020, in particular LEIT-ICT, LEIT-NMBP, Energy, Space and Secure Societies.

International cooperation will play a key role in implementing the Work Programme priorities. Global transport challenges such as CO₂ and polluting emissions, oil dependency, transport safety and security, and standardisation of many services, products and procedures will all benefit from global solutions. Activities at the international level are also important to enhance the competitiveness of world leading European industries by promoting the take-up

and trade of novel technologies, in particular where the applicable regulatory regime is international and can thus result in barriers to the market introduction of innovative solutions coming from EU actors. Therefore cooperation as well as exchanges on transport R&I strategies and investment priorities with major partner countries, for example US, Japan, China, Canada, Brazil and the neighbouring countries will be pursued where added-value for the EU can be expected.