The specific objective is to achieve a European transport system that is resource-efficient, climate- and environmentally-friendly, safe and seamless for the benefit of all citizens, the economy and society.

Europe must reconcile the growing mobility needs of its citizens and goods and the changing needs shaped by new demographic and societal challenges with the imperatives of economic performance and the requirements of an energy-efficient low-carbon society and climate-resilient economy. Despite its growth, the transport sector must achieve a substantial reduction in greenhouse gases and other adverse environmental impacts, and must break its dependency on oil and other fossil fuels, while maintaining high levels of efficiency and mobility and promoting territorial cohesion.

Sustainable mobility can only be achieved through a radical change in the transport system, including in public transport, inspired by breakthroughs in transport research, far-reaching innovation, and a coherent, Europe-wide implementation of greener, safer, more reliable and smarter transport solutions.

Research and innovation must bring about focused and timely advances for all transport modes that will help achieve key Union policy objectives, while boosting economic competitiveness, supporting the transition to a climate-resilient, energy-efficient and low-carbon economy, and maintaining global market leadership both for the service industry as well as the manufacturing industry.

Although the necessary investments in research, innovation and deployment will be significant, failing to improve the sustainability of the whole transport and mobility system and failing to maintain European technological leadership in transport will result in unacceptably high societal, ecological, and economic costs in the long term, and damaging consequences on European jobs and long-term economic growth.

Rationale and Union added value

Transport is a major driver of Europe's economic competitiveness and growth. It ensures the mobility of people and goods necessary for an integrated European single market, territorial cohesion and an open and inclusive society. It represents one of Europe's greatest assets in terms of industrial capability and quality of service, playing a leading role in many world markets. Transport industry and transport equipment manufacturing together represent 6.3 % of the Union GDP. The transport sector's overall contribution to the Union economy is even greater, taking into account trade, services and mobility of workers. At the same time, the European transport industry faces increasingly fierce competition from other parts of the world. Breakthrough technologies will be required to secure Europe's future competitive edge and to mitigate the drawbacks of our current transport system.

The transport sector is a major contributor to greenhouse gases and generates up to a quarter of all emissions. It is also a major contributor to other air pollution problems. Transport is still 96 % dependent on fossil fuels. It is essential to reduce this environmental impact through targeted technological improvement, bearing in mind that each mode of transport faces varying challenges and is characterised by different technology integration cycles. Moreover, congestion is an increasing problem; systems are not yet sufficiently smart; alternative options for shifting towards more sustainable modes of transport are not always attractive; road fatalities remain dramatically high at 34 000 per year in the Union; citizens and businesses expect a transport system that is accessible to all, safe and secure. The urban context poses specific challenges and provides opportunities to the sustainability of transport and for a better quality of life.
Within a few decades the expected growth rates of transport would drive European traffic into a gridlock and make its economic costs and societal impact unbearable, with adverse economic and societal repercussions. If trends of the past continue in the future, passenger-kilometres are predicted to double over the next 40 years and grow twice as fast for air travel. CO2 emissions would grow 35 % by 2050. Congestion costs would increase by about 50 %, to nearly EUR 200 billion annually. The external costs of accidents would increase by about EUR 60 billion compared to 2005.

Business-as-usual is therefore not an option. Research and innovation, driven by policy objectives and focused on the key challenges, shall contribute substantially to achieve the Union's targets of limiting global temperature increase to 2 °C, cutting 60 % of CO2 emissions from transport, drastically reducing congestion and accident costs, and virtually eradicating road deaths by 2050.

The problems of pollution, congestion, safety and security are common throughout the Union and call for collaborative Europe-wide responses. Accelerating the development and deployment of new technologies and innovative solutions for vehicles, infrastructures and transport management will be essential to achieve a cleaner, safer, more secure, accessible and more efficient intermodal and multimodal transport system in the Union; to deliver the results necessary to mitigate climate change and improve resource efficiency; and to maintain European leadership on the world markets for transport-related products and services. These objectives cannot be achieved through fragmented national efforts alone.

Union level funding of transport research and innovation will complement Member States' activities by focusing on activities with a clear European added value. This means that emphasis will be placed on priority areas that match European policy objectives where a critical mass of effort is necessary, where Europe-wide, interoperable or multimodal integrated transport solutions can help remove bottlenecks in the transport system, or where pooling efforts transnationally and making better use of and effectively disseminating existing research evidence can reduce research investment risks, pioneer common standards and shorten time to market of research results.

Research and innovation activities shall include a wide range of initiatives, including relevant public-private partnerships, that cover the full innovation chain and follow an integrated approach to innovative transport solutions. Several activities are specifically intended to help bring results to the market: a programmatic approach to research and innovation, demonstration projects, market take-up actions and support for standardisation, regulation and innovative procurement strategies all serve this goal. In addition, using stakeholders' engagement and expertise will help bridge the gap between research results and their deployment in the transport sector.

Investing in research and innovation for a greener, smarter and fully integrated reliable transport system will make an important contribution to the objectives of the Europe 2020 strategy and of its flagship initiative 'Innovation Union'. The activities will support the implementation of the White Paper 'Roadmap to a Single European Transport Area - Towards a competitive and resource efficient transport system'. They will also contribute to the policy goals outlined in the flagship initiatives 'Resource-efficient Europe', 'An Industrial Policy for the Globalisation Era' and 'Digital Agenda for Europe'. They will also interface with the relevant Joint Programming Initiatives.

**Broad lines of the activities**

The activities will be organised in such a way as to allow for an integrated and mode-specific approach as appropriate. Multiannual visibility and continuity will be necessary in order to take into account the specificities of each transport mode and the holistic nature of challenges, as well as the relevant Strategic Research and Innovation Agendas of the transport-related European Technology Platforms.

**(a) Resource-efficient transport that respects the environment**

The aim is to minimise transport systems' impact on climate and the environment (including noise and air pollution) by improving their quality and efficiency in the use of natural resources and fuel, and by reducing greenhouse gas emissions and dependence on fossil fuels. The focus of activities shall be to reduce resource consumption, particularly fossil fuels, greenhouse gas emissions and noise levels, as well as to improve transport and vehicle efficiency; to accelerate the development, manufacturing and deployment of a new generation of clean (electric, hydrogen and other low or zero emission) vehicles, including through breakthroughs and optimisation in engines, energy storage and infrastructure; to explore and exploit the potential of alternative and sustainable fuels and innovative and more efficient propulsion and operating systems, including fuel infrastructure and charging; to optimise the planning and use of infrastructures, by means of intelligent transport systems, logistics, and smart management; and to increase the use of demand management and public and non-motorised transport, and of intermodal mobility chains, particularly in urban areas. Innovation aimed at achieving low or zero emissions in all modes of transport will be encouraged.

**(b) Better mobility, less congestion, more safety and security**

The aim is to reconcile the growing mobility needs with improved transport fluidity, through innovative solutions for seamless, intermodal, inclusive, accessible, affordable, safe, secure, healthy, and robust transport systems. The focus of activities shall be to reduce congestion, improve accessibility, interoperability and passenger choices, and to match user needs by developing and promoting integrated door-to-door transport, mobility management and logistics; to enhance intermodality and the deployment of smart planning and management solutions; and to drastically reduce the occurrence of accidents and the impact of security threats.

**(c) Global leadership for the European transport industry**

The aim is to reinforce the competitiveness and performance of European transport manufacturing industries and related services (including
logistic processes, maintenance, repair, retrofitting and recycling) while retaining areas of European leadership (e.g. aeronautics).

The focus of activities shall be to develop the next generation of innovative air, waterborne and land transport means, ensure sustainable manufacturing of innovative systems and equipment and to prepare the ground for future transport means, by working on novel technologies, concepts and designs, smart control systems and interoperable standards, efficient production processes, innovative services and certification procedures, shorter development times and reduced lifecycle costs without compromising operational safety and security.

(d) Socio-economic and behavioural research and forward-looking activities for policy making

The aim is to support improved policy making which is necessary to promote innovation and meet the challenges raised by transport and the societal needs related to it. The focus of activities shall be to improve the understanding of transport-related socio-economic impacts, trends and prospects, including the evolution of future demand, and provide policy makers with evidence-based data and analyses. Attention will also be paid to the dissemination of results emerging from these activities.

Context

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