Transport is fundamental to our economy and society. Mobility is vital for the internal market and for the quality of life of citizens as they enjoy their freedom to travel. Transport enables economic growth and the creation of jobs. It must be sustainable in the light of the new challenges we face.

Transport is global, so effective action requires strong international cooperation. The future prosperity of our continent will depend on the ability of all its regions to remain fully and competitively integrated in the world economy. Efficient transport is vital in making this happen. European

transport is at a crossroads. Old challenges remain, and new ones have come. A great deal needs to be done to complete the internal market for transport where considerable bottlenecks and other barriers remain. We need to readdress these issues such as how to better respond to the desire of our citizens to travel

and to the needs of our economy to transport goods while anticipating resource and environmental constraints. The transport systems of the eastern and western parts of Europe must be united to fully reflect the transport needs of almost the whole continent. Oil will become scarcer in future decades

as it is replenished increasingly from uncertain supplies. As the International Energy Agency has recently pointed out, the less successful the world is in de-carbonising, the greater will be the increase in the price of oil. If we do not address this oil dependence, people’s ability to travel as well as our

economic security could be severely impacted with dire consequences resulting in inflation, trade imbalance, and the overall competitiveness of the European Union economy. Despite technical progress, the potential for cost-effective, energy-efficiency improvements and policy efforts as well as the

transport system have not changed fundamentally since the first big oil crisis forty years ago. Transport has become more energy efficient, but European Union transport still depends on oil and oil products. Transport has become cleaner, but increased volumes mean it remains a major source of noise and local air

pollution. New technologies for vehicles and traffic management will be key to lower transport emissions in the European Union as well as in the rest of the world. The race for sustainable mobility is a global one. Delayed action and timid introduction of new technologies could condemn the European Union transport

industry and cause irreversible decline. The European Union’s transport sector faces growing competition in rapidly developing world transport markets. Many European companies are world leaders in infrastructure, logistics, traffic management systems, and manufacturing of transport equipment. However, as

other world regions are launching huge, ambitious transport modernisation and infrastructure investment programmes, it is crucial that European transport continues to develop and invest in maintaining its competitive position. Infrastructure shapes mobility. No major change in transport will be possible without

the support of an adequate network and more intelligence in using it. Overall, transport infrastructure investments have a positive impact on economic growth, create wealth and jobs, enhance trade, geographical accessibility, and the mobility of people. It has to be planned in a way that maximises a positive

impact on economic growth and minimises the negative impact on the environment. Congestion is a major concern that compromises accessibility, particularly on the roadways and in the sky. In addition, transport infrastructure is unequally developed in the eastern and western parts of the European Union, which need to

be brought together. Increased pressure on public resources for infrastructure funding exists everywhere, and a new approach to funding and pricing is needed. Since the delivery of the White Paper on Transport, a great deal has been achieved. The opening of additional markets has taken place in aviation, roadway, and

partially in rail transport. The Single European Sky has been successfully launched. The safety and security of transport across all modes of travel has increased. New rules on working conditions and on passenger rights have been adopted. Trans-European transport networks that have been financed

through Structural Funds and the Cohesion Funds have contributed to territorial stability and the building of high-speed railway lines. International ties and cooperation have been strengthened. A great deal has also been done to enhance transport's environmental performance. Still, however, the

transport system is not sustainable. Looking forty years ahead, it is clear that transport cannot develop along the same path. Building on the lessons learned, this road map takes a global look at developments in the transport sector, at its future challenges, and at the policy initiatives that need to be

considered. There is a large pay-off in taking decisive policy action. The transport industry in itself represents an important part of the economy. In the European Union, it directly employs approximately 10 million people and accounts for about 5 percent of the gross domestic product. The European

Union and governments need to provide clarity on the future policy frameworks, relying to the greatest extent possible on market-based mechanisms for manufacturers and industry so that they are able to plan investments. Coherence at the European-Union level is vital. For example, if one Member

State opted exclusively for electric cars and another only for bio-fuels, this situation would destroy the concept of free travel across Europe. The challenge is to break the transport system's dependence on oil without sacrificing its efficiency and compromising mobility. In line with the flagship initiative

Resource Efficient Europe and the new Energy Efficiency Plan, the paramount goal of the European transport policy is to help establish a system that underpins European economic progress, enhances competitiveness, and offers high-quality mobility services while using resources more efficiently. In practice,

transport has to use less and cleaner energy, better exploit a modern infrastructure, and reduce its negative impact on the environment and key natural assets like water, land, and ecosystems. Curbing mobility is not an option. New transport patterns must emerge, affording larger volumes of freight and

greater numbers of travellers to be carried jointly to their destination by the most efficient combination of methods. Individual transport is preferably used for the final miles of the journey and performed with clean vehicles. Information technology provides for simpler and more reliable transfers.

Transport users pay for the full costs of conveyance in exchange for less congestion, more information, better service, and more safety. Future development must rely on a number of sectors, such as improving the energy efficiency performance of vehicles across all modes of transportation, optimising the performance

of multimodal logistic chains, including making greater use of inherently more resource-efficient methods because other technological innovations may be insufficient. It is important to use transport and infrastructure more efficiently through the use of improved traffic management and information systems,

advanced logistic and market measures, such as the full development of an integrated European railway market, the abolition of barriers that utilize shipping by sea for short distances, undistorted pricing, et cetera. Action cannot be delayed. Infrastructure takes many years to plan, build, and

equip. Trains, planes, and ships last for decades. The choices we make today will determine transport in 2050. We need to act on a European level to ensure the transformation of transport is defined together with our partners rather than determined elsewhere in the world. The depth and scope for changing the way

transport operates varies across transport segments because the technological options for each segment are different. The Commission’s vision, therefore, considers three major transport segments: medium distances, long distances, and urban transport. Delivery of them will rely not only upon the European Union, the

Member States, regions, cities, but also upon industry, social partners, and citizens who will have their parts to play. Regarding the intermediate distances, new technologies are less mature, and the modal choices are fewer than in the city. However, in this area European-Union action can have the most

immediate impact. More resource-efficient vehicles and cleaner fuels are unlikely to achieve on their own the necessary reductions in emissions, and they will not solve the problem of congestion. They need to be accompanied by the consolidation of large volumes of transfers over long distances. This goal

implies the greater use of buses and coaches, rail and air transport for passengers, and for freight, multimodal solutions that rely on waterborne and rail modes for long-hauls. Better modal choices will result from greater integration of the modal networks. Airports, ports, railway, metro systems, and bus

stations should be linked and transformed increasingly into multimodal connection platforms for passengers. On-line information and electronic booking and payment systems that integrate all means of transport should facilitate multimodal travel. An appropriate set of passengers' rights has to

accompany the wider use of collective modes. Freight shipments over short and medium distances will, to a considerable extent, remain with truckers. Besides encouraging alternative transport solutions, it is, therefore, important to improve truck efficiency via the development and the use of new engines and

cleaner fuels, the use of intelligent transport systems as well as further measures to enhance market mechanisms. Regarding longer distances, options for road de-carbonisation are more limited, and freight multi-modality has to become economically attractive for shippers. Efficient co-modality is needed. The

European Union needs specially developed freight corridors that are optimum in terms of energy use and emissions, thereby minimising the environmental impact as well as being attractive because of their reliability, low operating costs, and administrative ease of implementation. Rail, especially for

freight, is sometimes seen as an unattractive mode. But examples in some Member States have proven that it can offer quality services. The challenge is to ensure structural change, thereby enabling rail to compete effectively by hauling a significantly greater proportion of medium- and long-distance freight.

Considerable investments will be needed to expand and to upgrade the capacity of the rail network. New rolling freight cars with silent brakes and automatic couplings should be gradually introduced. On the coasts, more and efficient entry points into European markets are needed to avoid unnecessary

traffic crossing Europe. Seaports have a major role as logistic centres and require efficient hinterland connections. Their development is vital in handling increased volumes of freight both by short-distance sea shipping within the European Union and with the rest of the world. Inland waterways, where unused

potential exists, have to play an increasing role, particularly in moving goods to the hinterland and in linking the European seas. The maritime and aviation sectors are inherently global in scope. Improving the efficiency of aircraft and traffic management operations has to be pursued in the air sector. It

will secure a competitive advantage in addition to reducing emissions. Attention is needed, however, in avoiding imposing burdens on the European Union operations, which could compromise the European Union’s role as a global aviation hub. Airport capacity needs to be optimal and, where necessary,

increased to accommodate the growing demand for travel to and from third-world countries and areas of Europe otherwise poorly connected, which could result in more than doubling the European Union air-transport activities by 2050. On the other hand, high-speed rail should absorb much medium-distance

traffic. The European Union aviation industry should become a frontrunner in the use of low-carbon fuels in reaching the 2050 target. In the maritime sector, the need for a global level-playing field is equally important. In cooperation with the International Maritime Organization and other international

organisations, the European Union should strive for the universal application and enforcement of high standards of safety, security, environmental protection, working conditions as well as eliminating piracy. The environmental record of shipping can and must be improved by both technology and

better fuels and operations. In cities, switching to cleaner transport is facilitated by lesser requirements for vehicle range and higher population density. Public transport choices are more widely available as well as the option of walking and cycling. Cities suffer most from congestion, poor air quality,

and noise exposure. The gradual phasing out of conventionally fueled vehicles from the urban environment will be a major contribution to the significant reduction of oil dependence, greenhouse gas emissions as well as local air and noise pollution. It will have to be complemented by the development

of the appropriate fueling and charging infrastructure for new vehicles. A larger share of travel by collective transport, combined with minimum-service obligations, will allow for increasing the density and frequency of service, thereby generating a virtual circle for public transport modes.

Demand management and land-use planning can lower traffic volumes. Facilitating walking and cycling should become an integral part of urban mobility and infrastructure design. The use of smaller, lighter and more specialised passenger vehicles must be encouraged. Large fleets of urban buses, taxis, and

delivery vans are particularly suitable for the introduction of alternative propulsion systems and fuels. These innovations could make a substantial contribution in reducing the carbon intensity of urban transport while providing a test site for new technologies and the opportunity for early market deployment.

Road pricing and the removal of misrepresentations in taxation can also assist in encouraging the use of public transport and the gradual introduction of alternative propulsion. The interface between long-distance and last-mile freight transport should be organised more efficiently. The aim is to limit

individual deliveries, which are the most inefficient part of the journey, while achieving the shortest possible route. The use of Intelligent Transport Systems contributes to real-time traffic management, thereby reducing delivery times and congestion for last-mile distribution. This task could be

performed with low-emission urban trucks. The use of electric, hydrogen, and hybrid technologies would not only reduce air emissions, but also noise, allowing a greater portion of freight transport within the urban areas to take place at night. This change in procedure would ease the problem of road congestion

during the morning and afternoon peak hours. Implementing the above vision requires an efficient framework for transport users and operators as well as the early deployment of new technologies and the development of adequate infrastructure. Obstacles to a smooth functioning of and effective competition

in the internal market persist. The objective for the next decade is to create a genuine Single European Transport Area by eliminating all residual barriers between modes and national systems, easing the process of integration and facilitating the emergence of multinational and multimodal operators. A vigilant

enforcement of the competition rules across all transport modes will complement the Commission’s actions in this area. To avoid tensions and misrepresentations, a higher degree of convergence and enforcement of social, safety, security, and environmental rules as well as minimum service standards and users’ rights

must be an integral part of this strategy. Innovation is also essential for this strategy. The European Union research needs to address the full cycle of research, innovation, and deployment in an integrated way by focusing on the most promising technologies and bringing together all actors

involved. Innovation can also play a role in promoting more sustainable behaviour. The efforts expended in creating a more competitive and sustainable transport system need to include reflection upon the required characteristics of the network and must foresee adequate investments. The European Union transport

infrastructure policy needs a common vision and sufficient resources. The costs of transport should be reflected in its price in an accurate way. A Single European Transport Area should ease the movements of citizens and freight, thereby reducing costs and enhancing the sustainability of European

transport. The Single European Sky needs to be implemented as previously set forth, and the European Commission will address the capacity and quality of airports. The area where bottlenecks are still most evident is the internal market for rail services, which must be completed as a priority in order to achieve

a Single European Railway Area. This project includes the abolishment of technical, administrative, legal obstacles, which still impede entry to national railway markets. A further integration of the road freight market will render road transport more efficient and competitive. For maritime

transport, a Blue Belt in the seas around Europe shall simplify the formalities for ships travelling between European Union ports, and a suitable framework must be established to take care of European tasks for inland waterway transport. Market access to ports needs to be further improved. The opening of

markets needs to go hand in hand with quality jobs and working conditions because human resources are a crucial component of any high-quality transport system. The fact that labour and skill shortages will become a serious concern for transport in the future is also widely known. It will be important to align

the competitiveness and the social agenda as well as building on social dialogue, thereby preventing social conflicts, which have proved to cause significant economic losses in a number of sectors, most importantly aviation. Transport security is high on the European Union’s agenda. The European Union’s

comprehensive approach of policy, legislation, and monitoring of air and maritime transport security should be further consolidated and strengthened through cooperation with major international partners. For passenger security, screening methods need to be improved in order to ensure high security

levels with minimum hassle. A risk-based approach to the security of cargo originating outside the European Union should be considered. A need also exists to find an appropriate European approach to land transport security in those areas where European Union action has an added value. Setting the

framework for safe transport is essential for the European citizen. A European Strategy for civil aviation safety will be developed, while adopting new technologies and, obviously, international cooperation with the main partners. In maritime transport, passenger ship safety needs to be proactively

addressed. The Vessel Traffic Monitoring and information systems will become the core of all the relevant maritime information tools supporting maritime transport safety and security as well as the protection of the environment from vessel-induced pollution. This network will provide the essential contributions

for the establishment of a common information-sharing environment for the surveillance of the European Union maritime domain and support the creation of a common maritime sector. For rail transport, the harmonisation and supervision of safety certification are essential in a Single European Railway Area.

In these three transport sectors, the European aviation, maritime, and rail safety agencies, which were set up in the last decade, play an indispensable role. Even though the number of road facilities in the European Union was almost halved in the past decade, initiatives in the areas of technology,

enforcement, education as well as particular attention to vulnerable road users will be key to reducing drastically these losses of lives even further. The quality, accessibility, and reliability of transport services will gain increasing importance in the coming years, among other things, due to

the aging of the population and the need to promote public transport. Attractive frequencies, comfort, easy access, reliability of services, and intermodal integration are the main characteristics of service quality. The availability of information about travelling time and routing alternatives is

equally relevant to ensure door-to-door mobility, both for passengers and for freight. The European Union has already established a comprehensive set of passengers' rights, which will be further consolidated. Following the ash-cloud crisis and the experience of extreme weather incidents in 2010, it has

become evident that Mobility Continuity Plans may be required to preserve the mobility of passengers and goods in a crisis situation. These events also demonstrated the need for the increased resilience of the transport system through scenario development and disaster planning. Growing out of oil will not

be possible by relying upon a single technological solution. A new concept of mobility, supported by a cluster of new technologies as well as more sustainable behaviour will be required. Technological innovation can achieve a faster and cheaper transition to a more efficient and sustainable European

transport system by acting on three main factors: the efficiency of vehicles through new engines, materials, and design; cleaner energy use through new fuels and propulsion systems; better use of networks and safer and more secure operations through information and communication systems. The synergies with other

sustainability objectives, such as the reduction of oil dependence, the competitiveness of Europe’s automotive industry as well as health benefits, especially improved air quality in cities, make a compelling case for the European Union to increase its efforts in accelerating the development and early

deployment of clean vehicles. Transport research and innovation policy should increasingly support in a coherent way the development and deployment of the key technologies needed to develop the European Union transport system into a modern, efficient, and user friendly system. To be more effective,

technological research needs to be complemented by embracing all the systems, taking care of infrastructure and regulatory requirements, coordination of multiple sectors, and large demonstration projects that encourage market acceptance. The Commission will devise an innovation and deployment strategy for

the transport sector in close cooperation with the Strategic Energy Technology Plan, thereby identifying appropriate governance and financing instruments in order to ensure a rapid deployment of research results. These innovations will also include the deployment of smart mobility systems that will be

developed through European Union-funded research, such as the air-traffic management system of the future, the European rail traffic management system and rail information systems, maritime surveillance systems, river information services, and intelligence transport systems. They will also require an

investment plan for new navigation, traffic monitoring, and communication services. Of equal importance is research and innovation in the field of vehicle propulsion technologies and alternative fuels. Innovation and deployment need to be supported by a framework of regulatory requirements. Protection

of privacy and personal data will have to be developed through the wider use of information technology tools. Standardisation that includes international specifications enables European businesses to benefit fully from the entire European transport market and to create worldwide market opportunities. New

mobility concepts cannot be imposed. To promote more sustainable behaviour, better mobility planning has to be widely available. Smart inter-modal ticketing with common European Union standards that respect EU competition rules is vital. This standardisation relates not only to passenger transport but also to freight,

where better electronic route planning across all modes adapts legal, environmental, and real-time delivery information for smaller consignments as well. Information and communication technology also has the potential for satisfying certain accessibility needs without additional mobility. In the urban

context, a mixed strategy involving land-use planning, pricing schemes, efficient public transport services and infrastructure for non-motorised modes and the charging or re-fuelling of clean vehicles is needed to reduce congestion and emissions. Cities above a certain size should be encouraged to develop Urban

Mobility Plans, bringing all those elements together. Urban Mobility Plans should be fully aligned with Integrated Urban Development Plans. A framework that includes the entire European Union will be needed in order to make interurban and urban-road user charging systems interoperable. Europe needs

a core network of corridors that carry large and consolidated volumes of freight and passenger traffic with high efficiency and low emissions. Thanks to the extensive use of more efficient modes in multimodal combinations and the wide application of advanced technologies and a supply infrastructure of clean

fuels, this goal will be realized. Because of the enlargement of the European Union, large divergences in terms of the transport infrastructure remain between the eastern and western parts of the European Union, and they need to be addressed. The European continent needs to be united also in terms of

infrastructure. Within this core network, information technology tools should be widely deployed to simplify administrative procedures, provide for cargo tracking and tracing, and optimise schedules and traffic flows. The core network must ensure efficient multi-modal links between the capitals of the European

Union and other main cities, ports, airports, and key land border crossings as well as other main economic centres. This plan should focus on the completion of missing links such as cross-border sections, bottlenecks, and bypasses as well as on upgrading the existing infrastructure and the development of

multimodal terminals at sea and river ports and on city logistic consolidation centres. Better rail-airport connections must be devised for long-distance travel. The Motorways of the Sea will be the maritime dimension of the core network. The selection of projects eligible for European Union funding must reflect

this vision and put greater emphasis on European added value. Co-funded projects should reflect equally the need for an infrastructure that minimizes the impact on the safety and security of its users. Diversified sources of finance both from the public and private sectors are required. Better coordination

of the Cohesion and Structural Funds with transport policy objectives is needed, and the Member States need to ensure that sufficient national funding is available in their budgetary planning as well as sufficient project planning and implementation capacities. Other sources of funding to be

considered include charges for infrastructure use, which could create additional revenue streams, making infrastructure investments more attractive to private capital. Unlocking the potential of private finances requires an improved regulatory framework and innovative financial instruments. Project

assessment and authorisation must be carried out in an efficient and transparent manner that limits time, cost, and uncertainty. New financing instruments, for example, the European Union project bonds' initiative, can support the financing of Private Public Partnerships on a larger scale. Price signals play

a crucial role in many decisions that have long-lasting effects on the transport system. Transport charges and taxes must be restructured in the direction of a wider application of the polluter-pays' and user-pays' principle. They should underpin transport's role in promoting European competitiveness and

cohesion objectives, while the overall burden for the sector should reflect the total costs of transport, including infrastructure and external costs. Wider socioeconomic benefits and positive externalities justify some level of public funding, but in the future, transport users are likely to pay for

a higher proportion of the costs than today. It is important that correct and consistent monetary incentives are given to users, operators, and investors. The elimination of tax misrepresentations and unjustified subsidies and free and undisturbed competition are, therefore, part of the effort

to align market choices with sustainable needs. They are also necessary in establishing a level playing field between modes, which are in direct competition. As regards greenhouse gas emissions, two main market-based instruments are being used; namely, energy taxation and emission trading systems. Taxation

is currently applied to fuels used in land transport, while the emissions trading systems applies to the use of electricity. The revision of the Energy Taxation Directive will be an opportunity to ensure better coherence between the two instruments. At the same time, the European Union urges

a decision by the International Maritime Organization regarding a global instrument to be applied to maritime transport where climate-change costs are currently not internalized. The cost of local externalities, such as noise, air pollution, and congestion could be internalized through charging for the

use of infrastructure. For passenger cars, road charges are increasingly considered as an alternative way to generate revenue and influence traffic and travel behaviuor. The Commission will develop guidelines for the application of internalisation charges to all vehicles and on the whole network

to reflect at least the maintenance cost of infrastructure, congestion, air, and noise pollution. Along the same lines, and before 2020, the Commission will develop a common approach for the internalization of noise and local pollution costs on the whole rail network. Many branches of transport are treated

favourably in terms of taxation in comparison with the rest of the economy: tax treatment of company cars, VAT and energy tax exemptions on international sea and air transport, et cetera. Generally, these arrangements provide conflicting incentives with respect to the efforts of improving the efficiency of

the transport systems and reducing its external costs. The Commission will examine proposals for achieving greater consistency between the various elements of transport taxation as well as encouraging the rapid introduction of clean vehicles. Transport is fundamentally international. Because of this, most

actions in the Road Map are linked to challenges related to the development of transport beyond the European Union borders. Opening up third-country markets in transport services, products, and investments continues to have high priority. Transport is, therefore, included in all our trade negotiations.

Flexible strategies will be adopted to ensure the role of the European Union as a standard setter in the transport field. To that end, the Commission will focus on the following areas of actions; namely, extending internal market rules through work in international organizations and where relevant attaining full

European Union membership, promoting European safety, security, privacy, and environmental standards worldwide through bilateral and multilateral cooperation, reinforcing the transport dialogue with the main partners, extending our transport and infrastructure policy to our immediate neighbours, while

including them in the preparation of mobility continuity plans, and delivering closer market integration. Developing a cooperation framework similar to the Western Balkan Transport Treaty could be used to extend the rules of the European Union to other neighbouring countries. In addition, completing the

European Common aviation area of 58 countries and 1 billion inhabitants, cooperating with the Mediterranean partners in the implementation of a Mediterranean Maritime Strategy to enhance maritime safety, security and surveillance, promoting our approach globally, opening up transport markets to free and

undistorted competition and environmentally sustainable solutions, continuing to aim at great market access in transport in all relevant international negotiations will also help bring about the realisation of these goals. A transformation of the European transport system will only be possible through a

combination of manifold initiatives at all levels. The various actions and measures indicated in this Road Map will be further elaborated. The Commission will prepare appropriate legislative proposals in the next decade with key initiatives to be put forward during the current mandate. Each of its proposals will

be preceded by a thorough impact assessment, considering also the European Union added value and subsidiary aspects. The Commission will ensure its actions, increase the competitiveness of transport, while delivering the minimum 60-percent reduction of greenhouse gas emissions from transport needed by 2050, as

well as orienting itself to the ten goals, which should be seen as benchmarks. The Commission invites the European Parliament and the Council to endorse this Road Map to a Single European Transport Area, which is moving towards a competitive and resource efficient transport system and the attached list of actions.