



Road Transport Vision 2050

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Road Transport Vision 2050



Challenged by...

climate change
pollution congestion
limited resources
casualties
affordability
demographic change
uncertain social,
(geo-)political and
economic conditions
legacy
global competition

Green & Digital Transformation of vehicles and infrastructure
will enable our Vision:

**Energy-efficient
zero emission
technologies**

**High levels of
automation,
connectivity and AI**

**Vision
2050**

**Seamless mobility of people and goods
for the benefit of all EU citizens**

**Environmental sustainability: energy and resource
efficiency, decarbonisation and excellent air quality**

All-round protection: safety and security

**Highly efficient and resilient road transport:
a key element of the European mobility system**

**Europe as the world leader for
safe & sustainable road transport solutions**



Seamless mobility of people and goods for the benefit of all EU citizens



Vision: “All people and goods can reach their destinations in a way that is healthy, safe, affordable, reliable and comfortable all across Europe”

- **Seamless multimodal* transport solutions available and attractive to all, giving users the freedom to choose.**
 - **Fully multimodal Mobility as a Service** offers, satisfying requirements of affordability, reliability, resilience and overall trip quality.
 - Digital assistants & other services providing a **seamless experience to the user, including trip planning, pricing and payment.**
 - **Walking, cycling, collective and shared transport services forming the backbone of urban mobility.**
 - Motorised individual transport complementing this backbone where needed, e.g. giving access to mobility hubs.
 - Appropriate infrastructure supporting **healthy mobility, thanks to active modes** (walking and cycling).
 - **Information for the user** about the environmental impact and costs of all modes of transport **including an indication of external costs**, encouraging sustainable mobility behaviour and supporting a **“pay as you use”** basis for mobility services throughout Europe.
- **Mobility concepts for people and goods are optimized to ensure quality of life for all citizens.**
 - Geographic areas with different population densities **seamlessly connected** by optimal utilization of private and/or shared vehicles, public transport and convenient multimodality, supported by appropriate territorial integration and respecting the demographic, geographic, cultural and economic characteristics of different EU regions.
 - Connected and automated vehicles enabling **full inclusion of all users** in the mobility system, with a particular attention to children, people with reduced mobility and an ageing population.
 - **Smart multimodal logistics**, providing resilience and efficiency - including infrastructure capacity management for people and goods.
 - Intelligent solutions allowing the **rebalancing of land-use** thus improving the quality of life of citizens.



Environmental sustainability: Energy and resource efficiency, decarbonisation and excellent air quality



Vision: “Climate-neutral, zero pollution road transport satisfying circular economy and resource efficiency needs”

- **Zero pollution** from road transport, i.e.:
 - Rate of road transport-related air, water and soil pollution reduced to levels no longer considered harmful to health and natural ecosystems*.
 - **Significantly reduced noise emissions.**
 - **Transparent accounting schemes of residual emissions** from the complete life cycles of vehicles and infrastructure as internalised costs of transport.
- **100% renewable energy and sustainable** materials.**
 - **Renewable energy supply balanced between sectors** (transport, industry, households and services) **and between transport modes**
 - **Resilient energy supply** and associated services anytime and wherever required according to usage needs in road transport with smart charging/refuelling infrastructure supporting seamless zero-emission mobility.
 - **Energy and material efficient** road vehicles as well as physical and digital infrastructure.
 - **Resource efficient vehicle production** with minimum environmental impact.
 - **Circular economy** for vehicles and infrastructure – based on the 9Rs (refuse, rethink, reduce, reuse, repair, refurbish, remanufacture, repurpose, recycle and recover).
 - Availability of **affordable vehicles** for the mass market, following the idea of right-sizing, giving customers the freedom of choice regarding use cases and vehicle sizes.

* Definition of “zero pollution” according to EU Action Plan “Towards a Zero Pollution for Air, Water and Soil”

** “Sustainable materials” meaning materials which can be produced in required volumes without depleting non-renewable resources and without disrupting the established steady-state equilibrium of the environment and key natural resource systems. [Rutgers, The State University of New Jersey, Center for Sustainable Materials]



Highly efficient and resilient road transport: a key element of the European mobility system



Vision: “Infrastructure and traffic management provide highly efficient road network services at competitive cost with minimized congestion, regardless of actual conditions and disturbances”

- **Optimised usage of right-sized and cost-efficient infrastructure** for environmental and economic sustainability.
 - **Intelligent and dynamic access regulation** for people and goods transport to sensitive areas.
 - **Performance based standards** determining the access of freight vehicles to the road network and minimizing empty runs.
 - **Adaptive and flexible traffic management**, across all transport modes, including peak loads and considering the interdependencies between mobility demand, infrastructure load and energy usage, based on the prediction of demand and V2I communication.
 - Automated and **dynamic parking management integrated with smart bi-directional charging**.
- **Delays are extremely rare.**
 - Road transport system providing the **required capacity** to get people and goods safely to their destinations **in time**.
 - **Affordable and resilient road infrastructure**, including the charging infrastructure, able to provide its functions even after disturbances and requiring minimum maintenance.
 - **Construction and infrastructure maintenance practices mostly automated**, leading to cost-efficiency and minimal works related safety risks or congestion.
 - **Predictive and anticipatory incident management** for all transport modes, aiming at resilience and minimised impact of all kinds of incidents and disruptive events.



All-round protection: safety and security

Vision: “Safe and secure mobility for all road users at any time”.

- **No-one becomes the victim of a road crash anymore.**
 - **Vision Zero** achieved: Zero fatalities nor severe injuries.
 - **Nearly zero crashes and injuries** as a consequence of high levels of road safety culture all over Europe, making full use of various levels of automation and complementary safety functions as well as safe road infrastructure design principles.
 - **High levels of in- and post-crash safety** in the remaining collisions.
- **The security of citizens is ensured in both the digital and the physical world.**
 - **Secured trustworthiness** of AI and data management in road transport as well as data privacy.
 - **High level of protection against crime and abuse** in road transport.
 - The road transport system contributing to **civil preparedness** to military attacks.

Europe as the world leader for safe & sustainable road transport solutions

Vision: “Europe’s road transport research and industry as the world leader in innovation, services and production”

- **EU industry driving the green & digital transformation of the road transport system with speed and agility.**
 - **Major value creation through vehicle production, including their software, in Europe’s value chain.**
 - **Resilient supply chains** for European sovereignty and sustainability, **particularly the electronics supply chain**, whilst including critical materials and components, such as those needed for permanent magnets, batteries and semi-conductors.
 - European network for customer-oriented transport and logistic services (**MaaS and TaaS made in Europe**) with the Physical Internet realised in logistics.
 - Competitive production and road transport services contributing significantly to the EU’s **prosperity**.
- **Europe being home to a highly attractive, well-functioning job market in road transport.**
 - **Europe as the first choice** for world-leading researchers, innovators, experts, entrepreneurs and the skilled workforce, enabled by an established innovation eco-system in road transport.
 - **Excellence in education, research and training** for all required skills and competences.

Cross-cutting Enabling Factors

Several technological, regulatory and organisational enablers need to be in place in 2050 to realise our Vision, such as:

- **Secure access to the digital world across Europe for the benefit of all.**
 - **Connectivity provided everywhere needed and at any time needed** with stable connection and data rates (gaps bridged sufficiently).
 - **Cyber-security** features protecting against attack and misuse.
 - **Safe, affordable, reliable digital infrastructure across Europe** extended and adapted for automated vehicles and seamless mobility solutions.
 - **Seamless and intuitive Human-Technology Interaction.**
- **Effective cooperation of all stakeholders towards the common vision.**
 - **Cross-sectoral collaboration fully established with all relevant stakeholders.**
 - **Essentially harmonized legal frameworks** from EU for global use in road transport and **international standards supporting Europe's global competitiveness.**
 - Methods, processes and European policies **accelerating innovation** and managing road transport system complexity.