

Main action area (1): Low-/zero emission mobility (electrification and hybridization and other alternative fuels)

Roadmap for Low-/zero emission mobility (electrification and hybridization and other alternative fuels)

Main Action Area (1): Low-/zero emission mobility (electrification and hybridization and other alternative fuels)				
Action Field (1) Technical and Operational Layers of Mobility	Action Items			Responsible Stakeholders
	Short term (2020)	Mid-term (2025)	Long term (2030)	
1,a) Vehicles	<p>Promote the development and large-scale deployment of electric and hybrid vehicles by</p> <ul style="list-style-type: none"> creating a policy framework which supports and facilitates innovation in transport supporting the development of cost-efficient, high-capacity, reliable and safe lithium-free batteries for electric and hybrid vehicles specifically supporting the activities for setting up battery cell production in Europe. 	<p>Initiate large-scale technology demonstrators for low-/zero-carbon transport vehicles in all modes. This regards electric heavy duty road vehicles, electrified demonstrators in air and waterborne transport as well as alternative low-emission fuels in applicable cases in all modes. Infrastructure for respective fuels and electricity should be approached in a synergetic manner for the different modes.</p> <p>Support the reduction of emissions from (air) transport by</p> <ul style="list-style-type: none"> introducing novel air transport system concepts that involve autonomous aircrafts and offer improvements in environmental impact and energy consumption 	<p>Introduce low-/zero-carbon transport vehicles, especially in air and waterborne as well as heavy duty road vehicles transport.</p> <p>Enable longer routes and higher loads with electric or hybrid ferries and port vessels, powered by wind and sun.</p> <p>Promote low-/zero emission transport in rail transport, targeting an electrification rate of more than 80%.</p> <p>Replace on-road logistics by drones and shared public transport</p>	<ul style="list-style-type: none"> Policy makers Industry R&D community Operators

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		<ul style="list-style-type: none"> integrating low environmental impact/low energy consumption autonomous air transport concepts into segregated air-space. 	services.	
	Promote the reduction of health problems caused by transport noise emissions by supporting further research on noise-reduced (freight) trains.			<ul style="list-style-type: none"> Policy Makers Industry R&D community
1,b) Infrastructure	Facilitate the wide deployment of standardized charging infrastructure for electric, hybrid or alternatively fueled vehicles in all modes by <ul style="list-style-type: none"> increasing investment in the development and deployment of renewable fuels and respective technologies and required infrastructure in order to ensure large-scale competitiveness. assessing the needs for (urban) charging infrastructure (conductive and inductive) for all modes and transport sectors and maximizing the share of renewable energies in the grid 	Sustain advancements by continuous support for successful investment mechanisms.		<ul style="list-style-type: none"> Policy makers Industry Operators

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1,b) Infrastructure	Support the deployment of on-road charging for E-Trucks by <ul style="list-style-type: none"> initiating pilot projects and test sites for different infrastructure charging options for electric E-Trucks developing a comprehensive cost-benefit analysis, including plans for funding, communication, and implementation while technology development is still being pursued. 	Support the wider deployment of on-road charging infrastructure for E-Trucks across the EU with focus on cross-border transport facilitated by common EU-wide standards and feasible business models.		<ul style="list-style-type: none"> Policy makers Operators Freight service operators R&D Industry
	Initiate projects to enhance energy efficiency in rail transport by e.g. by integrating rail into smart grids.			<ul style="list-style-type: none"> Policy makers Industry R&D community Operators
	Foster sustainability and material efficiency in transport by developing and introducing smart recycling infrastructure, especially for batteries and vehicle components.			<ul style="list-style-type: none"> Industry R&D community
1,c) Transport offers	Promote electric mobility in urban areas by <ul style="list-style-type: none"> establishing purely electric car sharing offers in cities, ideally integrated in the public transport system implementing short-term (non-permanent) benefits for early-adopters of electric vehicles, like free parking, using bus lanes etc. includ- 	Establish purely electric car sharing offers in rural areas, ideally implemented in a multimodal public transport system and explore incentives for usage.		<ul style="list-style-type: none"> Policy Makers Operators

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	ing a mechanism to monitor effectiveness and possible rebound effects when electric vehicle usage rises.			
		Meet growing transport demand by moving commuters from road or rail transport to water transport using electrified high-speed ferries in cities or regions with accessible waterways.	Foster the integration of waterways by providing seamless interfaces to other modes.	<ul style="list-style-type: none"> • Operators • Policy Makers

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Action Field (2) Societal aspects of mobility	Action Items			Responsible Stakeholders
	Short term (2020)	Mid-term (2025)	Long term (2030)	
2,a) Policy and regulatory framework	Promote the decarbonization of the transport system and the reduction of harmful emissions by transport in Europe by <ul style="list-style-type: none"> enacting policy measures to effectively reduce harmful emissions in transport, e.g. common emission standards throughout the EU establishing a regular control and adaptation process of emissions standards proposing strategies for an emission-based incentives scheme to enable a faster reaction on market changes monitoring of environmental footprint of different passenger transport solutions providing funding for the collaborative decarbonization of transport in all modes. 	Further decarbonization of the transport system and the reduction of harmful emissions by transport in Europe by <ul style="list-style-type: none"> supporting the member states in the implementation of regular control, discussion and adaptation process of CO2 standards establishing the emission-based incentives system enabling the determination of the carbon footprint in logistics and freight transport . Balance the use of different modes according to the real costs and sustainability aspects by <ul style="list-style-type: none"> internalizing the external costs into each transport mode, e.g. emissions supporting governments to apply the 'user pays' principle to reflect the costs of the use of infrastructure. 		<ul style="list-style-type: none"> Policy makers Industry NGOs Operators Shippers of goods Freight service operators
	Support the further implementation of electric rail infrastructure by <ul style="list-style-type: none"> Setting up a broad stakeholder group to come to an EU wide concept and 	Implement electrification of rail infrastructure according to the plan agreed on national and EU level.		<ul style="list-style-type: none"> Policy makers Operators Industry

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	plan for full electrification of rail infrastructure <ul style="list-style-type: none"> • Provide guidelines for member states to derive respective national plans • Initiating further projects on national level 			
Facilitate the wide deployment of standardized charging infrastructure for electric, hybrid or alternatively fueled vehicles in all modes by <ul style="list-style-type: none"> • reinforcing the development of sustainable business models • supporting member states in implementing the Alternative fuels directive² • specifically support cities in identifying feasible opportunities for deployment of charging infrastructure • support the deployment of electric bus fleets by introducing incentive schemes for the required charging infrastructure in urban and rural areas. 	Explore synergies in deployment of electric and alternative fuels infrastructure with all modes and in collaboration with energy networks for other sectors than transport.	Support the implementation of competitive renewable fuel production pathways by applying the best-practice findings of the analysis on potential incentives for a market introduction of renewable fuels in the previous step.	Support wide implementation of alternative fuels infrastructure according to demand in all modes.	<ul style="list-style-type: none"> • Policy makers • Industry • R&D community

² European Commission, Directive 2014/94/EU of the European Parliament and of the Council of 22 October 2014 on the deployment of alternative fuels infrastructure Text with EEA relevance

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		their bus fleet by <ul style="list-style-type: none"> identifying feasible opportunities for financing the charging infrastructure for buses. finding ways to ensure energy supply as required for powering electric bus fleets connecting charging infrastructure to urban smart grids. 		
	Promote the development and use of alternative fuels in waterborne transport by <ul style="list-style-type: none"> introducing strict environmental regulations in shipping and ports and the formulation of the necessary legal framework for the bunkering and use of alternative fuels in air transport by <ul style="list-style-type: none"> starting an initiative of relevant stakeholders and experts to analyze the potential of incentivizing the market introduction of renewable fuels, e.g. significant increment of prizes for conventional fuels so that they reflect the high societal costs, introducing subsidies for airlines for the purchase and use of renewable fuels 			<ul style="list-style-type: none"> Policy makers Industry R&D community

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	Short term (2020)	Mid-term (2025)	Long term (2030)	
	Support the mechanisms and effectiveness of the emissions trading market <i>in aviation</i> by <ul style="list-style-type: none"> initiating the installment of a global institution equipped with all necessary execution rights which is in charge for the balanced allocation of free carbon allowances to entities (industries/sectors, regions) and traded certificates developing tools for monitoring the development of market price of emissions and of the number of free carbon allowances being distributed and hence ensuring an effective level of emission reduction . 	Promote the reduction of emissions from (air) transport by <ul style="list-style-type: none"> the participation in the implementation of global emissions trading and offsetting measures. enacting the obligation to monitor and report detailed data on carbon emissions controlling the allocation of carbon allowances across industries and regions through the introduction of global standards for all emission producing entities. 		<ul style="list-style-type: none"> Policy Industry R&D community NGOs
	Facilitate the decarbonization of logistics by <ul style="list-style-type: none"> proposing a common regulatory framework promoting best practices to connect transport of people and goods agreeing on European wide tax scheme for using both road and rail for freight preventing road transport through free roads becoming more competitive than rail. 			<ul style="list-style-type: none"> Policy makers Industry R&D community Operators
2,b) User perspective	Raise user acceptance and information on			<ul style="list-style-type: none"> Operators

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	the benefits of electric road vehicles compared to conventional vehicles by promoting campaigns. Remove barriers to the utilization and purchase of electric vehicles by enabling users to stronger participation in the transition process through EV sharing services, (free) electric transport offers, (e.g. shuttles, taxis) combined living/ EV riding concepts etc.			<ul style="list-style-type: none"> • Policy • European Transport and Mobility Forum
	Design a low-/zero emission transport system tailored to user needs by <ul style="list-style-type: none"> • exploring user needs and expectations in cities, interurban and rural areas through regular user surveys and the implementation of big data • identifying average trips made per person, its purpose and carbon footprint and defining user profiles and mobility patterns in cities, interurban and rural areas • enabling users to control their personal carbon footprint (e.g. by means of a daily-use digital tool) and incentivizing its reduction by the introduction of gamification elements. 	Promote the implementation of a low-/zero emission user-centric transport system by <ul style="list-style-type: none"> • selecting best practices for the prediction of user needs and expectations • exploring opportunities to adapt transport offers to user needs and mobility patterns • using the personal carbon footprint as a mandatory parameter when making new development and make sure it does not increase 		<ul style="list-style-type: none"> • Policy • R&D community • User representatives

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Action Field (3) Multi-Stakeholder Interaction and Pro- cesses	Action Items			Responsible Stake- holders
	Short term (2020)	Mid-term (2025)	Long term (2030)	
3,a) Collaboration of Stakeholders	Promote the development and deployment of low-/zero emission vehicles in all modes by <ul style="list-style-type: none"> • fostering information exchange between cross-modal stakeholders • adapting push and pull measures in close cooperation of policy makers and industry • developing innovative procurement processes and instruments (urban) public transport services, fleets, fuel supply, etc. supporting the transition to low-carbon mobility at local and national levels. A focus should be on operators of public fleets, mobility service providers, e.g. accelerate procurement processes for electrified buses through simplified public tender requirements and regulations • competence building at local and national levels to carry out Green Public Procurement (GPP) Policies (e.g. setting up a competence centre). 	Support the harmonization of planning of energy and transport networks and their deployment by the formation of dedicated working groups of relevant stakeholders from energy and transport sector. Support the implementation of electric vehicle charging infrastructure by harmonizing the planning of energy and transport networks in member states and regions in dedicated working groups.		<ul style="list-style-type: none"> • Policy makers • Operators • Energy network operators, energy providers • Industry • R&D community

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	Short term (2020)	Mid-term (2025)	Long term (2030)	
3,a) Collaboration of Stakeholders	Facilitate knowledge and technology transfer between stakeholders working on electrification (including other alternative fuels) or automation of all modes by <ul style="list-style-type: none"> organizing workshops or conferences and initiating comprehensive projects stimulating a collaboration between ETPs in cross-ETP task forces implementing platforms and expert groups (i.e. Clean Bus Deployment Initiative). 	Provide the development of flexible infrastructure for energy supply to urban and rural areas as required by bringing stakeholders from different sectors together to promote sector coupling and connect infrastructures from transport, energy, sewage, heating/cooling etc. Find synergies for common utilization of existing infrastructures.		<ul style="list-style-type: none"> European Transport and Mobility Forum Operators Industry Policy makers R&D Community
3,b) Standardization	Support the deployment of a Pan-European infrastructure network by <ul style="list-style-type: none"> initiating standardization activities for on-road charging for E-Trucks in the EU supporting standardization activities for wireless charging 	Support member states in the implementation of standardized wireless and conductive charging infrastructure. Promote rail electrification in Europe by introducing EU wide standardized rail electrification concepts.		<ul style="list-style-type: none"> Policy makers Standardization bodies Industry R&D community

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	Initiate a multi-stakeholder dialogue about an EU-wide standard for dynamic urban road user charging (parking and congestion charging)			
	Foster interconnectivity and efficiency of logistics by the use of standardized modular containers equipped with standardized protocols and interfaces in a physical internet			<ul style="list-style-type: none"> • Industry • R&D community • Shippers of goods • Freight service operators