



## ENHANCING CLIMATE AMBITION IN TRANSPORT

SIX ACTION RECOMMENDATIONS FOR POLICYMAKERS TO ALIGN TRANSPORT WITH THE PARIS AGREEMENT AND THE SUSTAINABLE DEVELOPMENT AGENDA

# **Enhancing Climate Ambition in Transport**

Six Action Recommendations for Policymakers to Align Transport with the Paris Agreement and the Sustainable Development Agenda

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## **Context**

The *Advancing Transport Climate Strategies (TraCS)* project is implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and funded through the International Climate Initiative of the German Ministry for the Environment, Nature Conservation, and Nuclear Safety (BMU). Its objective is to enable policy makers in partner countries (Vietnam, Kenya and Morocco) to specify the contribution of the transport sector to their respective Nationally Determined Contributions (NDCs) and Long-term Low Greenhouse Gas Emission Development Strategies (LTS). In addition, detailed knowledge on mitigation potential can lead to raising the level of the countries' ambitions.

TraCS supports ministries of environment and transport and other relevant authorities in systematically assessing GHG emissions in the transport sector and calculating emission reduction potential through the development of scenarios. TraCS also assists with the development and implementation of associated climate policy measures. At the international level, TraCS organises active exchanges between implementing partners, technical experts, and donor organisations to enhance methodological coherence in emission quantification in the transport sector.

This paper synthesizes key documents produced by the international community on enhancing climate ambition in transport and distils them into clear recommendations for national stakeholders. The six action recommendations lay the groundwork for a second study on analysing the contribution of the transport sector in the – by then – updated or enhanced NDCs. This second study will be written together with the Partnership for Low Carbon Transport and is due for publication in the second half of 2020.

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## The need for action

Dramatic reductions in greenhouse gas (GHG) emissions will be needed in the coming decades to keep global warming well below 2°C and avoid dangerous climate change. While the power sector has made great strides towards decarbonisation, the transport sector has done relatively little, with transport sector emissions continuing to increase in most countries. Without swift, ambitious action to transform our transport systems, it will be impossible to meet the 2°C target. Yet beyond merely reducing emissions, we should harness this transformative moment to usher in a just, sustainable and safe transport system, one that contributes to meeting both the UN's Sustainable Development Goals (SDGs) and the objectives of the Paris Agreement.

### Box 1: Transport sector emissions

Currently, the transport sector is responsible for roughly one quarter of global energy related GHG emissions and is the fastest growing emissions sector. Without rapid and ambitious mitigation action, transport emissions could more than double by 2050 (SLoCaT 2018b). The recent IPCC Special Report "Global Warming of 1.5°C" again emphasised the urgent need for action to prevent dangerous climate impacts. It also highlighted that deep reductions are possible. However, for the sector to be in line with 1.5°C scenarios, it needs to return to 2010 emission levels by 2030 (IPCC 2018).

The IEA estimates that by 2050 transport sector emissions need to decrease to around 3 Gt CO<sub>2</sub> per year (down from an estimated 7.23 Gt CO<sub>2</sub> in 2015) to limit global warming to well below 2°C (ITF 2019). This will only be possible if global transport sector emissions peak well before 2030. At the same time, transport policymakers around the world are struggling to provide sufficient infrastructure for increasing demand and are seeking to cope with the growing negative effects of current transport systems, such as congestion, air pollution and roadway accidents.

The transport sector is currently in a state of flux. New technologies and business models could propel the transformation of the sector in a positive direction, yet proactive policy action is needed to ensure that future developments are truly beneficial for the overall sustainability of the system. Given the scope of change required, policy guidance will be essential to coordinate trends and maximise the benefits for the climate and human welfare. The next few years will be crucial for steering the sector towards zero emissions by mid-century. Accordingly, *Long Term Strategies* (LTS) and *Nationally Determined Contributions* (NDCs) need to lay out pathways to zero-carbon transport while also providing a springboard for bold transformative action.<sup>1</sup>

Rapid growth in transport demand as well as institutional and behavioural inertia will be crucial impediments to change (ITF 2019). Many changes will involve massive infrastructure investment, in turn necessitating extended periods for planning and implementation. Furthermore, vehicle turnover rates will retard the impact of measures to address vehicle technology and efficiency. Accordingly, it will not be enough to concentrate on "quick wins" (KWC 2019). Every year that ambitious measures are delayed means a lower chance of achieving a decarbonised transport sector by 2050 (Transport & Environment 2018).

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<sup>1</sup> More information on NDCs and long-term strategies is provided in the section titled "Opportunities at the international level".

## **Providing guidance to national transport decision-makers**

In recent years, transport sector experts have made great advances in increasing awareness for the ways in which transport can be made more sustainable. The global community is far better informed about where we stand in implementing climate action, and about which policy options exist for mitigating emissions. However, officials who work in national departments for transport policy, particularly those in developing countries, often have a difficult time obtaining accurate data, understanding the mitigation pathways that are available and/or developing specific policy measures.

Against this backdrop, this paper synthesizes key documents produced by the international community on enhancing climate ambition in transport and distils them into clear, essential recommendations for national stakeholders. The aim is to support policymakers in better understanding options for additional climate action, particularly during upcoming NDC revisions. In this way, the paper seeks to facilitate greater ambition in the transport sector, such that expressions of commitment also give rise to tangible action on the ground.

Primarily intended for national decision-makers in the transport sector, this paper provides guidance on how to build policy frameworks that help to mitigate greenhouse gas emissions while also improving the overall sustainability of the transport system. The paper additionally makes the case for enhanced cooperation between transport departments and other line ministries of relevance to transport systems, such as finance ministries, which influence taxes and incentives; energy ministries, which manage energy regulation; and planning ministries, which are responsible for land use policy, including those at the local and regional levels.

Transport ministries cannot simply mandate all of the change that is required; initiative must also come “from below”. Accordingly, the recommendations developed in this paper aim to support national decision-makers in defining where national action is needed and how they can guide and support other actors, such as cities and the private sector.

The recommendations may also be useful to individuals working specifically on NDC development or policy experts who advise the target audience, including GIZ staff. The suggested actions will additionally provide a point of reference for evaluating the transport-related ambition of submitted NDCs in late 2020.

The recommendations presented in this paper were developed based on a meta-analysis of a broad range of other policy recommendations and insights. Emphasis was placed on devising recommendations that have tangible value for national stakeholders. In this connection, we consider the transport sector as a whole. As part of our analysis, we have given due consideration to actions addressing the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO).

The paper presents six key recommendations, each of which contain numerous individual “calls to action”. The full decarbonisation of the transport sector will require policy ambition in all areas at the same time. While the first category called "Objective" focuses on vision, the other calls to action then outline how this vision can be implemented in practice.

## Box 2: “Calls to action” by category



**Objective – What do we need to achieve?** Calls to action marked with this symbol discuss the new perspectives and mindsets that need to be adopted to enable decarbonisation of the sector.



**Milestones – What are the mid- and long-term targets?**<sup>2</sup> Calls to action with this symbol identify targets for the sector as a whole or in specific domains. Targets can also relate to the implementation of specific instruments. In some cases, countries would be advised to first set a broad target for the sector that can then inform what needs to happen next and how. Alternatively, they look at what is feasible in a specific context, and then determine the target.



**Policy – What policy instruments can be used to achieve targets?** Calls to action in this category provide guidance on what is needed to achieve transport sector targets. This can include standards, incentives, information campaigns, subsidy reforms, as well as investments and financing options.



**Partners – Who is needed and what is the process?** This category looks at underlying stakeholders and policy development. Calls to action in this area address the need for enhanced coordination between governmental bodies and non-state actors.



**Technology – Which technological advances are possible?** This call to action highlights potential technological advances, both inside and outside the transport sector.

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<sup>2</sup> “Long-term” refers to targets around 2050, while “mid-term” refers to the intermediate targets needed to get there (e.g. for 2030 or 2040).

## The vision for a sustainable transport system

Experts agree that the passenger transport system of the future will be shared and electric. Freight transport, for its part, will be optimised to maximise load factors; will rely on rail and waterways for long distances; and will be supported by zero-emission trucks for medium distances and electric light-duty vehicles for last-mile delivery.

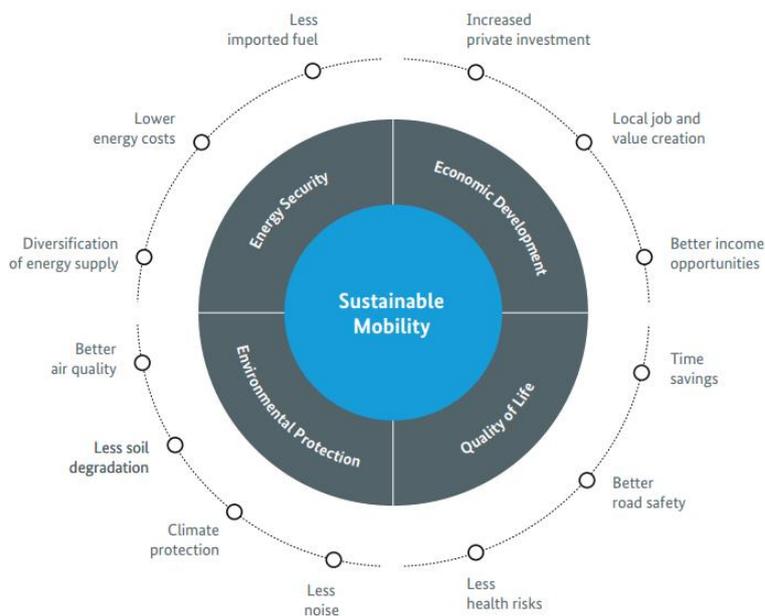
Transport planning will need to focus on people and goods instead of vehicles. Many challenges that decision-makers in the sector face today will be easier to address when an emphasis is placed on ensuring safe, attractive and affordable mobility, rather than accommodating more vehicles.

*“The transport transformation necessarily rests on two pillars: the ‘mobility transition’ and the ‘energy transition in transport’.”*

Agora Verkehrswende (2017): Transforming Transport to Ensure Tomorrow’s Mobility

New mobility solutions, such as bike, car and ride sharing, will enable the more efficient use of vehicles and infrastructure. However, it requires a deep integration in the overall transport system, e.g. bans of private vehicles in certain areas or road pricing (UC Davis and ITDP, 2017). Modern IT solutions allow individual ownership to be supplanted by sharing services, thus enabling the most appropriate and convenient modes of transport to be dynamically combined (PPMC 2018). Intelligent land use planning can induce shorter trips and foster more compact development (WRI 2019), and should be supplemented by measures that increase vehicle load factors (i.e. more people or goods per vehicle).

This vision is based on the A-S-I approach, which refers to “avoiding” the need for motorised travel and long trips; “shifting” to more efficient and environmentally friendly modes of transport; and “improving” vehicle and fuel efficiency as well as using renewable energy. When new mobility patterns are adopted in tandem with zero emission fuel sources, this will not only reduce greenhouse gas emissions, but also improve quality of life and encourage a more sustainable economy.



The transport system is an important aspect of the UN’s Sustainable Development Goals (SDGs). Transport services and infrastructure are essential to achieving most, if not all, of the SDGs. This underscores the benefits of our action recommendations beyond the mere reduction of greenhouse gas emissions.

Figure 1 – The benefits of sustainable mobility (source: GIZ 2019)

## Six essential action recommendations: How to get there

The recommendations outlined in the following paragraphs aim to facilitate more ambitious climate action in the transport sector. Policymakers would be advised to consider them when enhancing their NDCs in early 2020 or drafting long-term strategies to be submitted before COP26 in November 2020. Yet beyond their value for international climate policy, these recommendations can help various departments of government to revise their transport-related policies and plans. Figure 2 provides a quick overview of the action recommendations.

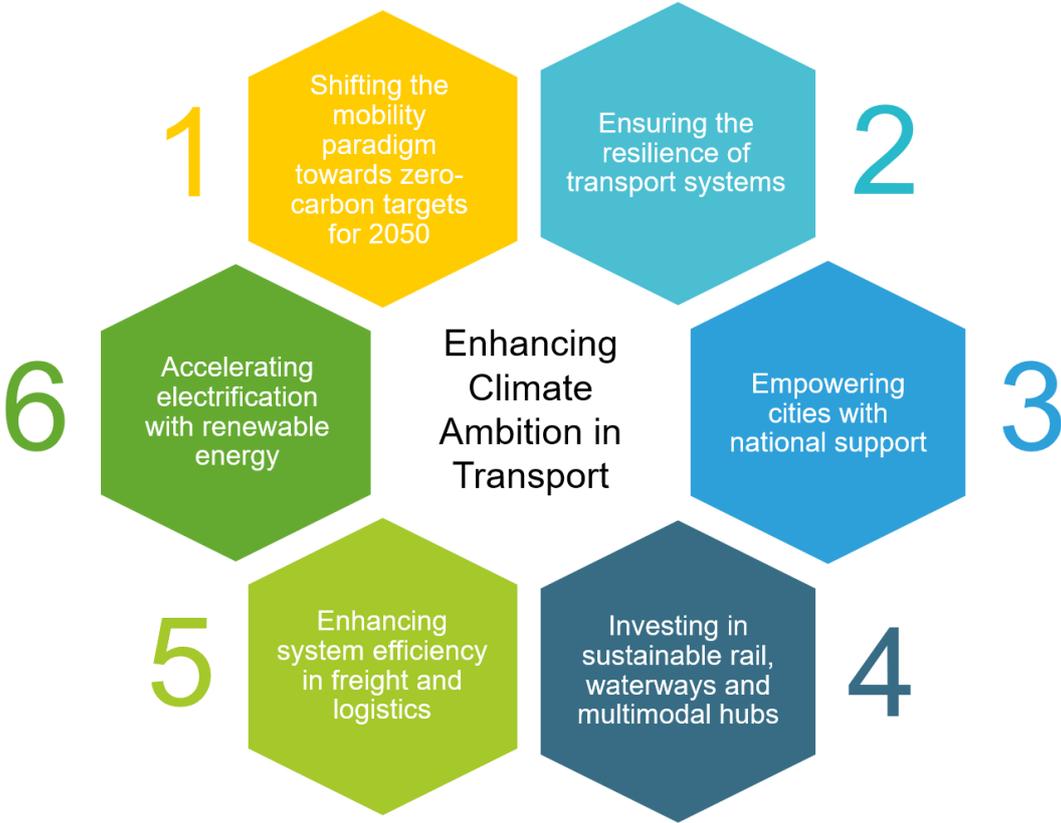


Figure 2: Six essential action recommendations for policymakers (source: authors' own elaboration)

## Recommendation 1

### Shifting the mobility paradigm towards zero carbon targets for 2050

Moving away from the marginal reduction of emissions and towards the creation of a net-zero transport system by 2050 is essential for reaching global climate goals – and for making transport more equitable, sustainable and safe. We cannot rely on technologies that only deliver enhanced vehicle efficiency, despite their importance for short- and medium-term emission reductions. Instead, we need a comprehensive approach that seeks to “avoid, shift, improve and electrify” in freight and passenger transport. Decarbonisation targets should reflect this multifaceted approach. Long-term national zero-carbon targets for the transport sector should be translated into suitable intermediate targets. Fulfilling these targets should be made legally mandatory and a national measuring, reporting, and verification (MRV) framework should be adopted to keep track of progress.

#### Box 3: A good practice example – Sweden’s Climate Act

By 2030, transport sector emissions are to be reduced by 70% compared to 2010, according to Swedish law passed in 2017. Also by 2030, Sweden’s overall climate impact is to be reduced by 63% compared to 1990 (excluding sectors covered by emissions trading).

By 2045 Sweden aims to reduce its climate impact to net zero, which is understood as an 85% emissions reduction compared to 1990. Remaining emissions are to be offset by environmental buffers, primarily in the forest sector, and by reducing emissions in other countries on Sweden’s behalf.

Source: Sweden’s Climate Act and Climate Policy Framework

#### Focus on people and goods, not vehicles

*“The transition ... will require an almost complete change of mind-set for all.”*

Transport Decarbonisation Alliance (2018): Decarbonising Transport by 2050

With overall transport demand growing, system efficiency will be important for ensuring affordable, safe and attractive mobility for all. Rather than focusing on individual modes of transport in isolation, we must consider mobility as a tool that fulfils specific needs. Integrated mobility solutions have the potential to make transport more efficient, sustainable and people-friendly. In addition to increasing the quantity and quality of public transport, of walking and cycling paths, and of public space, integrated mobility solutions should consider land-use policies and urban planning, encouraging shorter trips and denser development. Fuel efficiency standards can provide valuable short-term emission reductions and electric vehicles offer further benefits. Today, these measures are often the focus of national governments, but alone they can neither deliver the required emissions reductions nor adequately address the sector’s sustainability challenges.



## **Set sector targets so that emissions peak around 2030 and reach net zero by 2050**

*“By 2050 global transport sector emissions need to decrease to around 3 Gt CO<sub>2</sub> per year to limit global warming to well below 2°C.”*

OECD International Transport Forum: Transport Outlook 2019

Setting ambitious decarbonisation targets for the sector can be a powerful driver of the deep transformation that will be required to achieve inclusive, efficient, safe and green mobility. Ambitious targets send a powerful signal to all stakeholders and ensure reliable conditions for long-term investment. According to the Paris Agreement, the transport sector (including international aviation and maritime transport) needs to be almost fully decarbonised by mid-century. To achieve this, global GHG emissions must peak well before 2030, with developed countries peaking well before 2030 and developing countries peaking around 2030 to enable decarbonisation by 2050. Peaking much later will make necessary reductions towards net zero emissions extremely challenging. National governments need to set national sector targets and push for ambitious global targets for aviation and maritime transport.



## **Start now**

*“Net decarbonization of the transport sector by 2050 is possible, but will require an immediate and concerted turnaround of global policy action.”*

Paris Process on Mobility and Climate: COP24 Key Transport Messages

In view of transport sector inertia stemming from long-investment cycles and path dependencies created through large-scale infrastructure, policy changes need to be initiated in the next few years if complete decarbonisation is to occur by 2050. Otherwise, the timeframe for gradual change will be too short. Indeed, every year that ambitious measures are delayed, the more difficult it will be to achieve the 2050 goal. Failure to act now also ensures that the numerous problems associated with existing transport systems will persist, including air and noise pollution, troublesome traffic accidents rates, and the exclusion of rural and poor urban residents from economic opportunities.



## **Include stakeholders in the process of defining the best way to achieve targets**

*“Collaboration between the public and private sectors is a growing reality that must be further facilitated.”*

Paris Process on Mobility and Climate: COP25 Key Transport Messages

The large-scale transformation of the transport sector requires the support of a wide range of stakeholders and close collaboration between the public and private sectors. Improved dialogue between the domains of urban planning, finance, business and energy under the rubric of climate protection will help decision-makers to design more effective policy instruments and address the challenges that accompany ambitious change, including negative impacts to existing business models and jobs. The development of alternative approaches to individually owned vehicles (such as shared vehicles and enhanced ride-sharing options) through collaboration between the automotive industry, transport service

providers and civil society will help to address these challenges and encourage private investment. Working with regional actors and cities can engender new opportunities and enable ambitious action across the board.



### **Create space for testing new technologies, business models and solutions**

*“With new technologies come also a new potential to move away from a road-centric paradigm.”*

Sustainable Mobility for All (2019): Global Roadmap of Action toward Sustainable Mobility

The transport sector is about to undergo rapid and fundamental change. Alternative technologies and business models are increasingly challenging current paradigms, such as private vehicle ownership and fixed-schedule public transport, and modern information technologies are changing how we work and shop. These changes offer tremendous opportunities for building more attractive, inclusive, safe and clean transport systems, but they also pose the risk of increasing transport demand while exacerbating unequal access. To maximise benefits and minimise negative outcomes, proactive government guidance that is informed by real-world experience will be essential. National governments can bring together stakeholders, remove regulatory barriers to the testing of new solutions, and provide funding and expertise. Early experimentation can help governments to avoid negative outcomes and design appropriate policy frameworks.

## Recommendation 2

### Ensuring the resilience of transport systems

Transport systems are vulnerable to climate change. Services and infrastructure are not only threatened by slow-onset impacts, such as sea level rise and increasing temperatures, but also by extreme climate events. Governments must ensure that resilient transport solutions are developed at all levels of transport planning. This is essential for handling the effects of a changing climate and ensuring the mobility of passengers and goods.



#### Consider the impact of climate change in transport planning

*“Left unmanaged, climate change will significantly affect the operational, financial, environmental and social performance of transport.”*

Paris Process on Mobility and Climate 2017: A Global Macro Roadmap Outlining an Actionable Vision Towards Decarbonized, Resilient Transport

Disruptions to transport services have a direct negative impact on the economy and society – and climate change exacerbates existing challenges in the provision of sufficient and sustainable mobility services. Consideration of climate change at all planning levels is thus essential if governments are to design resilient systems that reduce long-term costs while remaining reliable.



#### Provide frameworks that make adapting to climate change part of the planning process

*“Climate factors must be considered when making long-term decisions about transport infrastructure investment, location and design.”*

SLoCaT: Transport and Climate Change 2018 Global Status Report

The assessment of climate change risk and vulnerability needs to become an integral part of transport system planning and should be legally required. Adapting to expected impacts can mean using alternative materials, changing designs, adding protective elements or choosing different sites in infrastructure projects. Existing systems need to be evaluated and, whenever possible, modernised. The adoption of design standards and technical norms at the national level can support stakeholders in this process. International standards such as the new ISO 14090 Adaptation to Climate Change standard can also provide guidance.<sup>3</sup> To ensure climate change adaptation works in practice, policies, plans and building codes must take into account local conditions and vulnerabilities.

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<sup>3</sup> More information about the standard is available at: <https://www.iso.org/standard/68507.html>



## **Raise awareness and build capacity on adaptation**

*“Convincing municipal government officials of the importance of adapting is a prerequisite for a successful adaptation strategy.”*

GIZ (2009): Adapting Urban Transport to Climate Change

Resilient transport infrastructure and mobility services will only be possible if transport actors at all levels of government are aware of the threats posed by climate change to the systems entrusted to them and possess tools and knowledge for addressing these challenges. This requires salient information to be collected and distributed and for stakeholders to receive training on how to select the best solutions.



## **Prepare transport authorities and providers for extreme climate events**

*“Identify and engage with all the stakeholders who own, manage, and influence the resilience of transport systems before, during and after disasters.”*

World Bank (2015): Moving Toward Climate-Resilient Transport

Disaster risk management and contingency planning, including early warning systems, can minimise the negative effects of extreme climate events. Such plans and systems ensure that emergency responses take place to restore critical infrastructure and maintain transport availability. To ensure the optimal implementation of such policies, coordination at various levels and between sectors are needed as well as innovative financial solutions. The private sector can assist with these funding activities. As businesses may be significantly impacted by climate-induced disruptions to transport systems, harnessing their ability to contribute to the solution will help to prioritise activities and secure necessary financing.

### Recommendation 3

## Empowering cities with national support



The world's population predominantly lives in urban areas. Accordingly, important aspects of the transport transformation will take place in cities. In many places, urban transport is associated with significant impairments to quality of life due to congestion, noise and poor air quality, among other factors. While the main responsibility for action lies with city governments, national policymakers must actively support cities in building sustainable urban transport systems. This will not only help to decarbonise transport, but also improve quality of urban life. In 2016, this call to action was also adopted as a key element of *The New Urban Agenda*.<sup>4</sup>



### Optimise urban mobility systems by adopting a user-oriented planning approach

“Attractive cities are not car friendly.”

Agora Verkehrswende (2017): Transforming Transport to Ensure Tomorrow's Mobility

To be attractive and efficient, urban transport systems must introduce seamless intermodal solutions that integrate walking and cycling, electric two- and three-wheelers, and shared rides with zero-emission vehicles. This will reduce reliance on privately owned motor vehicles, which, among other benefits, will decrease congestion and free up space formerly reserved for parking. Modern information technology will play a key role in this transition, thus underscoring the importance of adequate mobile and wireless network coverage. It is also important that cities reduce emissions associated with urban freight by, for example, adopting distribution systems capable of last-mile delivery with small electric vehicles.



### Consolidate national policy frameworks so cities can set intermediate targets for achieving full decarbonisation by 2050

“An effective driver for synergized success in transforming cities to enjoyable low-carbon cities is to set a phased course towards zero- (polluting) emission cities.”

Paris Process on Mobility and Climate (2017): A Global Macro Roadmap Outlining an Actionable Vision towards Decarbonized, Resilient Transport

While central governments tend to focus on setting ambitious national targets, it is important to provide a framework for cities to set their own intermediate goals for reaching full decarbonisation and addressing other challenges on the road to a sustainable mobility system. National frameworks need to provide a regulatory and investment environment for bold action at the municipal level by, among other things, facilitating information sharing, providing a reliable legal framework for action, and enabling new ideas to be tested. Municipal climate targets must be part of an overall strategy that seeks to foster sustainability while reducing air pollution and noise, enhancing safety and broadening access. Accountability mechanisms and monitoring, reporting and verification (MRV) frameworks can

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<sup>4</sup> New Urban Agenda: <http://habitat3.org/wp-content/uploads/NUA-English-With-Index-1.pdf>, see paragraph 114.

help to identify the measures that work while ensuring that valuable lessons are drawn from policy errors.



**Create national frameworks and investment programmes that drive the implementation of sustainable urban mobility plans and enable cities to think outside the box and test innovative ideas**

*“A National Urban Mobility Policy or Investment Programme aims at effectively enabling local governments to tackle urban mobility challenges.”*

MobiliseYourCity (2017): National Urban Mobility Policy Factsheet

National policy and regulatory frameworks must provide clear direction, create a stable environment for investment, and ensure that sustainable urban mobility plans mitigate any negative impact changes might cause (e.g. on employment). Clearly, any attempt to bring about fundamental change must consider local contexts, and therefore must harness the capabilities and ingenuity of local actors. National frameworks must encourage innovation in urban areas by granting cities leeway to test new ideas – for example, in parking management, zoning or transit-oriented urban planning – and support the deployment of successful solutions at scale.



**Launch national platforms that facilitate learning between cities and foster exchange between experts in transport and urban planning**

*“To plan and implement the transformation of urban transport, the transport community will need to work much more closely and effectively with the urban development community.”*

Paris Process on Mobility and Climate (2017): A Global Macro Roadmap Outlining an Actionable Vision towards Decarbonized, Resilient Transport

Many cities are already transitioning to sustainable low-carbon transport systems with varying levels of ambition, while others have yet to embark on this path. Opportunities for exchanging ideas and learning from one another – for example, through national platforms or peer-learning processes – will facilitate this process. At the municipal level, it is imperative that closer cooperation take place between transport and urban planners, private companies (such as mobility service providers) and public transport companies. Given the scale of change required, input regarding the appropriate instruments to achieve set targets must be sought from all stakeholders, including local citizens, in order to arrive at a better understanding of what is involved and address legitimate concerns early on.



## **Regulate shared mobility and new mobility services to ensure that public transport, walking and cycling reach their full potential**

*“New models of mobility would enable on demand, optimised sharing of vehicles and seamless mixing of modes and allow mobility providers to better target the needs and desires of individual travellers.”*

OECD International Transport Forum: Transport Outlook 2019

New mobility services must provide alternatives to private vehicle ownership and individual use. These services, which include shared mobility and “last-mile” options, should be designed to complement public transport, not replace it. Moreover, they must be seamlessly integrated into existing and planned public transport options, including integrated fare systems and real-time routing information. Standards for the operation of new mobility services are needed to ensure the safety of passengers and workers (such as insurance requirements, adequate driver training and vehicle safety standards).

## Recommendation 4

### Investing in sustainable rail, waterways and multimodal hubs

Investing in clean and efficient rail and waterway infrastructure and multimodal hubs – both for passenger and freight – will be crucial for augmenting mobility options while drastically reducing energy demand in long-distance passenger and freight transport. When combined with increased electrification and innovative zero-emission technologies for shared mobility, trucks and ships, these investments will enable cleaner, healthier and safer transport. Ideally, these investments should go hand-in-hand with the phasing out of fossil fuel subsidies.



#### Enable high shares of bus, rail and waterborne shipping in non-urban transport and shift to clean energy sources

*“Transport infrastructure drives transport activity.”*

SLoCaT: Transport and Climate Change 2018 Global Status Report

Sustainable and inclusive mobility systems for intercity and intraregional transport need compelling alternatives to cars, trucks and planes. To meet growing demand, facilitate affordable, easy-to-access options and provide safe and clean mobility solutions, governments must reverse the trend towards increased personal vehicle use and air travel. Existing transport systems need to be strengthened through IT solutions, improved operations, and conversion to renewable electricity or zero-emission fuels. A focus on shared and highly efficient modes of transport along main corridors will also ease the move towards cleaner energy sources such as renewable electricity, green hydrogen or other fuels from renewables.



#### Redirect investment towards efficient modes of transport and create incentives for zero-carbon technologies

*“It will be essential to set priorities and targets in the financing and planning of infrastructure in order to achieve the greatest possible shift from road to rail transport.”*

Agora Verkehrswende (2017): Transforming Transport to Ensure Tomorrow's Mobility

Existing transport budgets and investment plans need to be shifted away from roads and airports and towards new rail and waterway infrastructure, as well as the digital infrastructure required to manage efficient transport systems. Carbon pricing and other incentive mechanisms such as vehicle taxes or levies on air travel can discourage unsustainable modes of transport. Fossil fuel subsidies should be phased out.





### **Foster dialogue between major actors responsible for transport**

*“Regular dialog between cities and regions with major transport hubs can create a breeding ground for new initiatives and innovations.”*

Transport Decarbonisation Alliance (2018): Decarbonising Transport by 2050

Efforts to improve system efficiency and intermodal transport are often hindered by conflicting or overlapping areas of responsibility among public and private sector entities and by tensions between fiscal, safety and equity goals. Bringing all stakeholders on board in working groups, round tables or national platforms when defining the best path to sustainable long-distance and regional transport will provide a broader perspective and harness the creativity of those benefitting from improved mobility options.



### **Incorporate new technologies and business models into national transport planning**

*“In a sector poised for change, it is incumbent on transport policy makers to endeavour to anticipate the changes to come, but also – and perhaps more importantly – to determine how they plan to respond to these changes.”*

OECD International Transport Forum: Transport Outlook 2019

Driverless vehicles, blockchain technology, e-commerce and 3D printing are some of the developments that will strongly impact future transportation systems. Driverless vehicles and blockchain technology can enhance system efficiency and reduce costs, while 3D printing can change the types of goods transported. Governments need to be prepared for these developments, assessing how they can be utilised for better and more sustainable transport in their specific contexts, and enacting regulation when negative impacts are anticipated.

## Recommendation 5

### Enhancing system efficiency in freight and logistics

The movement of freight is integral to modern economies, but it also contributes to greenhouse gas emissions, air pollution and congestion, among other negative effects.<sup>5</sup> Governments should work to promote the long-term sustainability and competitiveness of the overall freight system, which, among other things, means optimizing efficiency in the sector. Due to strong growth in freight transport volumes, it may not be possible to fully decarbonise freight using alternative fuels in the absence of massive efficiency gains. Currently, too little attention is being devoted to rail and waterborne freight, the optimisation of freight services, and sustainable vehicle solutions for heavy freight.



#### Optimise logistics, enhance vehicle efficiency and provide sustainable infrastructure

*“Greater use of rail and inland water transport can help reduce the growth of freight-related GHG emissions, especially if this is done through renewable energy-operated railways and low-carbon shipping.”*

Paris Process on Mobility and Climate 2017: A Global Macro Roadmap Outlining an Actionable Vision Towards Decarbonized, Resilient Transport

Numerous factors are crucial for increasing system efficiency in freight transport, including increased load factors, improved railway effectiveness, greater network density, improved waterways and port infrastructure, reduced downtime for freight, and the development of multimodal logistics platforms. Particular attention and support are needed to develop transit corridors. Rail and waterways should serve as the backbone of the system, and multimodal hubs should be developed to enable seamless transitions between transport modes. In addition to enhancing energy efficiency, policymakers need to promote zero-emission energy solutions, such as renewable electricity and renewables-based hydrogen.



#### Develop comprehensive multimodal investment plans that make the sector more efficient and set targets for the share of freight transported by rail and inland waterways

*“Optimised supply chain networks have improved the efficiency of freight transport”*

Marrakech Partnership for Global Action (2019): Climate Action Pathways

Freight transport infrastructure – such as railways and ports – is built to last many decades. Planning and construction often take years and consume substantial resources. It is crucial to have a long-term vision for an efficient, zero-emission multimodal freight system as a basis for today’s investment decisions and to translate this into concrete plans for immediate action.<sup>6</sup> This will reduce long-term costs, avoid stranded assets and contribute to economic development.

<sup>5</sup> In 2015 freight accounted for 42% of transport sector emissions (excl. international transport) (SLoCaT 2018a) and is expected to grow by 225% up to 2050 (ITF 2019).

<sup>6</sup> For more information see the UNCTAD Framework for Sustainable Freight Transport at <https://www.sft-framework.org/>



### **Invest in rail and waterway infrastructure expansion, set incentives that promote efficient freight modes and provide policy frameworks that encourage improved logistics**

*“Build consolidation centres and exchange platforms with a focus on multimodal transport to avoid fragmented supply, production and distribution chains, and to foster private sector participation in investment and in the operation of logistics hubs.”*

Sustainable Mobility for All (2019): A Global Roadmap of Action Towards Sustainable Mobility

Investment budgets earmarked for road expansion should be diverted to construct rail and shipping infrastructure and logistics hubs that enable highly efficient multimodal systems, especially along main corridors. Services should be priced to take into account the overall sustainability of the system and relevant regulations, including minimum emission requirements for vehicles. Pricing should also be designed to make efficient modes of transport financially and logistically more attractive while rewarding private-sector initiative to improve efficiency. This will reduce costs while also encouraging freight system sustainability.



### **Make cities, regions and freight companies part of the solution by building on mutual interests and benefits**

*“Cities and regions play a major role in planning the development of [multimodal] platforms ... Such schemes have to be integrated at the national and international level, and cannot be developed without the input of companies that are the main shippers of goods.”*

Transport Decarbonisation Alliance 2018: Decarbonising Transport by 2050

Designing policies and investment plans for efficient, zero-carbon freight is not possible without the know-how and support of logistics companies, cities and regions. National governments need to engage in dialogue and draw on their expertise and capacity for innovation to determine the most appropriate solutions for reaching targets. The conditions for these types of interactions need to be adapted to fit the national culture while taking into account the natural competitiveness of business stakeholders.



### **Review investment plans and freight transport strategies to ensure they fully utilise the opportunities of new trends while minimising their negative effects**

*“This underlines the relevance of investment planning and project appraisal in the transport sector that factors in risk analysis and the uncertainty [of disruptions].”*

OECD International Transport Forum: Transport Outlook 2019

High-volume vehicles, e-commerce, 3D printing, new logistic and IT solutions, and the adoption of new forms of energy will massively change transport costs, volumes and logistics. The impact of these developments on the national transport system needs to be carefully considered and managed. Infrastructure investments may be required to accommodate new technologies, and some planned expansions may no longer be needed.

## Recommendation 6

### Accelerating electrification with renewable energy

The use of electric vehicles powered exclusively by renewable electricity is the most efficient way to decarbonise vehicles. Electrification will also massively reduce air and noise pollution, reduce dependence on oil imports and, when combined with more shared mobility options, substantially reduce overall system costs. In the case of aviation, long-distance maritime transport and heavy-duty trucks, alternatives may be needed, including hydrogen-based synthetic fuels generated using renewable electricity. In countries with relatively lower consumer purchasing power – such as Chile, China and India – the electrification of public transport and urban freight can start earlier, and higher private electric-vehicle ownership rates can be sought as a broader range of more affordable electric vehicles become available.



#### Phase out internal combustion engines and prepare the electricity grid for increased demand from the transport sector

*“There is a need for the rapid market penetration of zero-emission passenger vehicles and the elimination of combustion engine car sales.”*

Climate Action Tracker (2016): The Road Ahead – How Do We Move to Cleaner Car Fleets?

The passenger vehicle fleet must become fully electric and be accompanied by an increase in the use of electrically operated public transport, shared mobility services, bicycles and walking. This will require the development of charging infrastructure in addition to attractive and affordable electric vehicles. The freight sector should be electric wherever possible, with hydrogen or e-fuels only used as needed to supplement electrification (e.g. for heavy-duty freight, ships and airplanes). To meet climate targets, governments must ensure that electricity is generated from renewable sources while shifting passengers and freight away from individual, road-based modes of transport and towards shared rail and waterway options. To enable grids to deal with increased demand from the transport sector and variable renewable power generation, systems need to be improved and/or designed with this integration in mind. Moreover, they need to utilise the storage opportunities of vehicle batteries.



#### Set intermediate targets on the road to fully decarbonising electricity generation

*“Passenger transport – cars, two- and three-wheelers, public transport – needs to be fully electrified by no later than 2050.”*

SLoCaT: Transport and Climate Change 2018 Global Status Report

The direct use of electricity is the most efficient and sustainable alternative to fossil fuels, provided that this electricity is generated from renewable sources. Fully electric vehicles reduce air pollutants and lower noise levels, making cities more liveable. With the limited time available, “transitional” technologies such as natural gas vehicles will only delay the

deployment of zero-emission vehicles.<sup>7</sup> Passenger vehicles need to be 100% electric by 2050. Intermediate targets could focus on public and private fleets, specifying penetration rates for different types of vehicles on the road to full electrification. Alternatives to the direct use of electricity – in the form of hydrogen or other fuels produced with renewable electricity – may be needed for heavy-duty freight.

Ambitious targets need to be complemented by a clear roadmap of intermediate steps for both the electrification of the vehicle fleet and the expansion of renewable power generation. This will help all stakeholders to plan investment while reducing investment uncertainties.



### **Build frameworks that support a quick uptake of transport electrification**

*“Countries should adopt policies and programs that include zero-emission vehicle mandates and incentives, support the transition of all transportation modes to zero-emission vehicles, invest in smart charging infrastructure, and ensure policy and regulatory development to maximize the environmental, economic, social, and operational benefits of electric mobility for the transport and energy sectors.”*

WRI 2019: Transport NDC Enhancement Guidance

In the areas of passenger transport and light duty vehicles, electric vehicle technology is available and markets are becoming more mature and competitive. Further incentives are needed to ensure rapid adoption, however. There is no silver bullet – rather, a combination of measures is needed, including standardised charging technology, building codes that require EV-readiness, purchase incentives, vehicle taxes, fuel taxes, aggressive fuel efficiency or carbon emission standards, and direct investment in public infrastructure. When part of a broader transport strategy, these measures can also reduce air pollution, noise and congestion. In the area of heavy-duty freight, more research and development and pilot testing is needed, along with greater efforts to shift freight to rails and waterways. Incentives can also be directly tied to renewable electricity use – for example, by linking subsidies for charging infrastructure to the purchase of renewable electricity.

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<sup>7</sup> Switching from oil to gas can take years, if not decades, of investment, at the expense of developing more effective solutions. For a discussion, see TDA (2018): Decarbonising Transport by 2050.

#### Box 4: The sustainability of electric vehicles

If powered by renewable electricity, electric vehicles can make a tremendous contribution to reducing greenhouse gas and air pollutant emissions while also reducing traffic noise levels. However, simply replacing conventional vehicles will not address some of the broader challenges, especially in urban centres, such as congestion and limited space availability. It also won't address resource consumption or environmental and social issues related to the production and disposal of vehicles.

Battery production contributes significantly to the lifecycle emissions of EVs, and sourcing raw materials for lithium ion batteries, which are produced mostly of nickel and graphite, can have other negative environmental and social impacts (SLoCaT 2018b).

To minimise negative effects, the electrification of vehicles needs to go hand in hand with an increase in the use of public transport, shared mobility services, bicycles and walking. This will reduce the overall number of electric vehicles – and thus batteries – needed.

For the remaining electric fleet, ensuring the traceability and transparency of raw material supply chains will be important for fostering the sustainable sourcing of minerals (IEA 2019).

At the same time, it is essential to address possible hazards to human health and the environment during battery disposal or recycling. Initiatives to re-use batteries, e.g. for grid storage, will increase the lifetime of individual batteries and reduce overall production. At the end of their service life, batteries should be professionally recycled.



#### Strengthen collaboration between vehicle fleet and power grid operators to achieve mutual benefits for the energy and transport sectors

*“The successful transformation of the transport sector’s energy supply will require a much closer alignment of energy and transport strategies.”*

Paris Process on Mobility and Climate (2017): A Global Macro Roadmap Outlining an Actionable Vision Towards Decarbonized, Resilient Transport

The growing demand for renewable electricity in the transport sector requires a systemic approach that combines on-time power delivery with the utilisation of available battery storage capacity. Indeed, electric vehicles are a valuable resource for storing renewable energy and balancing the grid.<sup>8</sup> A close collaboration between transport planners, utility companies and grid operators can facilitate charging systems, technical standards and regulatory frameworks that benefit both passengers and the power sector.

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<sup>8</sup> By 2030, the amount of battery storage within electric vehicles is estimated to cumulatively reach more than 10 times the anticipated global market for all energy storage. For more information on frameworks to enhance the linkage, see WRI (2019): Enhancing NDCs: Opportunities in Transport.



**Plan for greater electrification in conjunction with shared mobility, and prepare for more automation in transport**

*“Widespread trip sharing and use of public transport can cut the number of vehicles in use dramatically and reduce traffic levels and congestion significantly, and (on a societal basis) provide cost savings that more than offset the higher purchase costs of automated EVs.”*

ITDP & UC Davis (2017): Three Revolutions in Urban Transportation

The full electrification of the vehicle fleet will be difficult without a substantial increase in the use of shared vehicles and public transport. The shift to a sharing architecture must reflect the design of charging infrastructure, payment models and vehicle incentives. Public fleets are a good starting point for testing the implementation of approaches that combine electric, shared and driverless options.

## Opportunities at the international level

In the run up to the Paris Climate Conference in 2015, almost all countries submitted Intended Nationally Determined Contributions (INDCs) to reduce greenhouse gas emissions and promote climate-resilient development. The NDCs are a proven framework for undertaking mitigation measures across energy sectors (GIZ 2017). Furthermore, the submitted NDCs are to be revised with more ambitious commitments every five years; the first round of updates is taking place in 2020.

*“Transport needs to be an integral part in almost all NDCs, otherwise well below 2 degrees is not doable.”*

Global NDC Conference (2019): Takeaways on Transport

In addition to the NDC process, the Paris Agreement encourages countries to develop and communicate long-term development strategies that are in accordance with the jointly agreed objectives. As of February 2020, 14 countries have submitted such strategies.

While developing revised NDCs and long-term strategies, countries would be well advised to devote considerable attention to the transport sector, given its importance to meeting the goals of the Paris Agreement.

### Bringing stakeholders to the table

NDC revisions can be a useful springboard for bringing together a wide range of stakeholders, particularly when the NDC process is linked to the updating of national transport strategies. Transport ministries should be actively involved in NDC development to allow closer integration between the NDCs and transport sector policies while also enhancing transport-ministry ownership (GIZ 2017).

The NDC process also offers an opportunity for transport ministries to engage more closely with other line ministries and different transport sector stakeholders to define or revise sector strategies and address air pollution, congestion, equitable access and climate change in a coordinated and efficient manner. Taking a more balanced approach to transport mitigation in NDC implementation plans, including the adoption of “Avoid,” “Shift” and “Improve” strategies, can create multiplier effects, thus significantly augmenting emission reductions (SLoCaT 2016).

### Harnessing international support for the transport sector

The NDC process provides an opportunity for countries to communicate their national ambitions to the international community. This audience includes stakeholders who can provide financial, technical and capacity-building support.

The international support provided for the NDC process can facilitate stakeholder engagement and ensure that policy measures are better aligned with real-world conditions while opening up new funding opportunities.

The involvement of international experts can also enhance local capacity, which is crucial for the successful implementation of activities. Many developing countries still lack sufficient

domestic capacity to design and implement ambitious measures in the transport sector and would benefit from enhanced support. Formulating NDCs with high ambition in the transport sector and clearly defining assistance needs can help international donors to better address these domestic requirements.

**Box 5: Ambitious NDCs and long-term strategies in transport: A key elements checklist**

- A commitment to a long-term zero-emission target for the transport sector
- Intermediate commitments towards the long-term target
- Legislation translating international commitments into national law
- Recognition of the importance of integrating resilience consideration into transport planning at all levels
- Recognition of the integrated approach needed to achieve zero emissions in the transport sector: reducing transport demand, shifting to more efficient modes and reducing the carbon footprint of vehicles, while enhancing the resilience of transport systems
- Recognition of the role of cities and other stakeholders and a commitment to support these stakeholders
- Recognition of rail and inland waterways as the backbone of transport infrastructure for passenger and freight movement
- Recognition for the need to enhance overall system efficiency for the movement of passengers and goods, in tandem with vehicle efficiency
- A commitment to long-term electrification of vehicles accompanied by an increase in the use of public transport, shared mobility services, bicycles and walking
- A commitment to increasing the share of renewable electricity hand-in-hand with increasing electrification of the transport sector

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