

# Reducing emissions of the transportation sector in the EU: strategies, and the role of governments, corporations, citizens.

The transportation sector is one of the most significant sources of global energy consumption. It is also one of the most important and fastest-growing greenhouse gas emission sources worldwide. In 2021, transportation accounted for 37% of greenhouse gas emissions of EU countries. As the world continues to grapple with climate change's impacts, reducing transportation sector emissions has become a critical priority. It is essential to analyze efforts made and compare solutions and pathways to a transition to a cleaner transportation sector to envision a greener future and where we are currently. In this editorial, we will explore various strategies to reduce energy consumption in the transportation sector, including modal shifts, alternative fuels, vehicle efficiency, and smart transportation systems. We will look at policies that can guide this transition and explore the significant actors within this change.

## **Modal Shift:**

Modal shift refers to how people travel from personal vehicles to more sustainable modes of transportation like public transit, cycling, or walking. One example of a modal shift is the construction of bike lanes or pedestrian paths, which can encourage more people to cycle or walk. Another example is the introduction of carpooling programs or park-and-ride facilities, which can reduce the number of single-occupancy vehicles on the road. Or incentives, such as free public transit passes or subsidies for electric bikes. Carpooling programs are often organized by employers and local authorities, pointing to a form of action brought about by corporations and local governments. Yet individuals play a key role in changing their habits and seeking out such programs, especially in countries where these programs are less common. In the case of the bike and pedestrian lanes, the shift is similarly pushed for following a governmental policy aiming for particular changes in society, yet with the aim to facilitate the engagement of citizens with changing their behaviors around cycling and walking.

## **Vehicle Efficiency:**

Vehicle efficiency refers to the measures taken to reduce the amount of energy required to operate a vehicle. Some examples of vehicle efficiency include improving engine efficiency, reducing vehicle weight, and enhancing aerodynamics. Moreover, hybrid and electric vehicles are vehicle types that are more efficient than traditional gasoline-powered vehicles, as they can use regenerative braking to recharge the battery while slowing down. Improving

vehicle efficiency can help reduce the amount of fuel required to operate a vehicle, which can significantly impact energy consumption and emissions (AFDC, 2023). Again, change happens through a multiplicity of actors. Governments can set targets for improving energy efficiency through policy: in 2023, the EU set a target of 11.7% energy efficiency for 2030, incentivizing national governments to implement policies to reach this goal. In the US, the government implemented a policy requiring vehicles to increase fuel efficiency by 8% for model years 2024-2025 and by 10% for model year 2026. This pushes corporations to make changes in the cars that they produce in order to meet these standards. Nonetheless, research has shown that policies for increasing vehicle efficiency must be accompanied by a range of other policies to affect emissions significantly.



Source: Kim, D. (2022).

### **Land use Planning:**

Land use encompasses land use for agricultural and forestry purposes and use for settlements, industries, roads, and other human activities. Within cities, land use planning that promotes compact urban development, mixed-use neighborhoods, and transit-oriented development can reduce the need for long-distance travel and encourage public transport, walking, and cycling. This is a strategy that governments can take at a regional level. Future planning and strategies will differ according to the particular constraints and contexts of different regions and cities. It is important to note that land use policies must be integrated with strict transport policies in order to impact emissions significantly: an intelligent combination of policies is crucial. Moreover, technological improvements are key to enhancing the effects of this combination of strategies.

### **Alternative Fuels:**

Alternative fuels are non-petroleum-based fuels that can be used to power vehicles and which have lower emissions than fossil fuels. For example, electric vehicles can be powered by renewable energy sources such as solar or wind power, while biofuels can be made from plant-based sources like corn or soybeans. Hydrogen fuel cells are another alternative fuel

option that produces zero emissions. European governments and private companies are investing heavily in developing alternative fuels, which are becoming increasingly cost-effective and accessible. This facilitates citizens choosing these greener options. Studies show that developing environmental policies such as carbon taxation and encouraging alternative fuel options dramatically decreases CO<sub>2</sub> emissions in all kinds of transportation modes.

### **Investment in Railway transportation:**

Given an expected doubling in global passenger and freight activity by 2050, implementing strategies to prevent this from being tied to a huge growth in carbon emissions is crucial. A greater reliance on rail holds the potential to cut this growth. Studies show that railway transport systems, including high-speed rail, play a key role in a future-proof, sustainably built environment. Trains have a much lower impact on the environment than cars. Importantly, high-speed rail can become an alternative to short-distance air travel. Facilitating such changes in our culture can be accelerated by policies on the part of the government, such as France's ban on short-haul flights since 2019 and the development of more effective railway systems.

### **Smart Transportation Systems:**

Smart transportation systems use emerging technologies to optimize traffic flow, reduce congestion, and improve efficiency. These systems also called intelligent transportation systems, use sensors and data analytics to manage traffic in real-time, or connected vehicles, which can communicate with each other to avoid collisions and optimize driving routes. Another example of a smart transportation system is carpooling apps, which reduce the number of vehicles on the road by encouraging people to share rides. Though smart transportation aims to increase efficiency and safety, we can significantly reduce energy consumption and emissions in the transportation sector by creating smart transportation systems. Smart transportation systems are often built following local governments implementing policies at a city level. It is important that during the conception and implementation phases of new "smart" technologies, all relevant considerations that relate to the sustainable aims of the technology be taken into account. Highlighting this is the example of the e-scooter, which, although running on electricity and thereby intuitively seeming eco-friendly, is actually harmful to the planet. The majority of the emissions of e-scooters come from the production process of batteries.

### **A combination of policy strategies:**

A comprehensive approach that combines several strategies will be necessary to achieve significant reductions. Investment from governments and corporations in research is crucial: studies show that an increase in research and development activities for technology improvement leads to an increase in vehicle design and innovation which results in the use of alternative-fuel vehicles and a decrease in energy use of conventional fuels. Finally, policies linked to alternative energy uses and investments in railway transportation have some of the most positive effects on emissions reduction scenarios.

**Current developments:**

Much of the historic transport emissions are dominated by Europe and North America, yet projected growth in emissions is located in Asia. Highly ambitious transport-related policies could cut emissions dramatically, and the steps that Europe takes can pave the way for other continents to follow in taking the necessary steps to halt global warming and ecological breakdown. Policies within EU countries have led, for instance, to the development of high-speed trains in the Netherlands, sustainable urban mobility in Bulgaria, and hydrogen-based solutions in France. In 2020, the EU beat its renewable energy targets, with almost 25% of its members' electricity sourced from renewable energy. This included 26 EU member states that met or exceeded their national renewable energy targets. Nonetheless, the International Energy Agency found that the world must double the transition rate to renewable energy to achieve net zero carbon by 2050. Net zero by 2050 is necessary for achieving the Paris Agreement's goal of limiting global warming to 1.5°C. This indicates a huge gap between current efforts and what we need to achieve. In terms of policy, this means that installations of all forms of renewable energy must be accelerated.

**What role can citizens play?**

Reducing how often and how far we travel is essential. De-normalizing the use of short-distance flights in our culture and normalizing more climate-friendly transportation options such as trains can have a significant impact. Citizens can work to change their habits, choose greener transport options, and demand measures from their governments similar to the short-haul ban in France.

Given the huge positive impact that a transition in the transport sector would have on emissions, we need to accelerate efforts to create more action. For this, attracting the widest number of groups in society will make a difference. Studies show that a cultural shift, thereby a more active engagement of citizens, is required to shift to sustainable transportation. Solving the climate crisis requires moving away from the binary of individual action versus system change and viewing them as interrelated.

**Conclusion:**

Modal shift, alternative fuels, vehicle efficiency, effective land use planning, and smart transportation systems are all essential strategies for reducing emissions in the transportation sector. These measures can help mitigate climate change's impacts, improve air quality, and create a more sustainable and resilient future, securing the health and livelihoods of future generations. The goal here has been to highlight how policy, corporate behavior, and the behavior of citizens interact in the transition to a greener transportation sector. We can make significant progress towards a cleaner and more sustainable world by working together to implement these strategies. Even in the transportation sector, where technological development is key, the observations above highlight that cultural change and political will are also essential to successfully transitioning to a green transportation sector.

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