

# Key policy insights for a transition to sustainable mobility

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## Context

Scenarios that achieve an EU 80% greenhouse gas emission reduction target relative to 1990 by 2050 tend to also show an 80% reduction in transport CO<sub>2</sub> emissions (freight and passenger combined). This translates into an almost complete decarbonization of land-based passenger transport by 2050, as freight and air travel are more difficult to decarbonize. In the past, however, we have seen an increasing demand for mobility. Decarbonization of land-based passenger transport requires substantial changes in mobility behavior, which is complex as it involves not only changes in transport systems, but also in lifestyles and culture and in the structure of the built environment.

## Key Messages

### *Strategies to decarbonize personal land-based mobility can be considered through different policy approaches*

These policy approaches are listed in Table 1, and include 1) improving and changing car mobility, 2) reducing the need to travel, 3) encouraging modal shift, and 4) reducing trip

*The EU FP7 project PATHWAYS explored the possibilities for transitions to a low-carbon, biodiversity-rich, sustainable Europe by combining the analysis of different scientific approaches: integrated assessment modelling, socio-technical transition analysis, and case studies and participative action research. Integrated assessment modelling can provide a macro perspective, linking future goals to short-term actions. Integrated assessment modelling also allows linking different policy issues, such as biodiversity protection and climate change. Socio-technical transition studies seek to explain long-term shifts, taking account of a broad set of institutional, economic, social, and cultural factors, including those enabling behaviour change and adoption of new technologies. Participative action research, finally, engages with concrete projects at the local and regional scale involving diverse social actors such as citizens, businesses, civil society organisations and (local) government, with the aim of fostering innovation and upscaling innovative sustainability solutions.*

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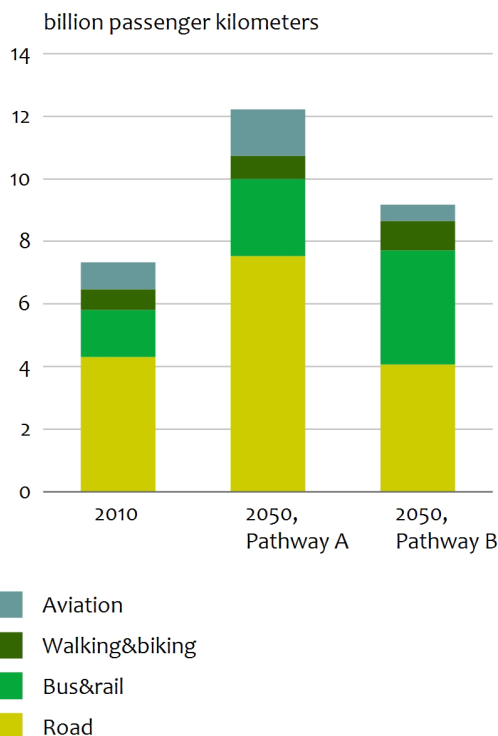
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length. Each of these approaches requires a range of changes in strategy and mobility choices. One ‘greening’ scenario may consist of a strong early prioritization of electric mobility choice. Transitional innovations, such as hybrids, may serve as stepping-stones that allow further electrification of mobility in a gradual way. They may also serve as buffers, as is partly the case for car-sharing which may allow a more gradual phase out of car ownership. In other cases, specific innovations support a combination of technologies, such as battery-electric vehicles and a culture of slow modes to produce light weight electric vehicles as an option for the mass diffusion of electric mobility. In another scenario, lifestyle and behavioural change may have a greater tendency for nurturing and supporting a combination of travel reduction, modal shift and reduced trip lengths (Figure 1).



**Figure 1** Total EU passenger travel demand per mode according to the IMAGE model. Source: Results from PATHWAYS project. For an explanation of the pathways, see text box below.

Approach	Level of intervention	Innovative technologies and practices
Encouraging greater efficiency ('greening')	Vehicle technology	Engine and fuel technology improvements and alternative drivetrains
Reducing the need to travel	Economy and lifestyle, redefinition of space and access	ICT, teleworking, internet shopping
Encouraging modal shift	Transport system	Inter-modal ticketing, urban bike hire schemes, congestion charging
Reducing trip lengths	Land use: Density and concentration of urban form and layouts	More integrated urban and transport planning – through compact and traffic-free cities

**Table 1** Contrasting approaches to sustainable mobility (based on Banister 2008)

The PATHWAYS project analysed alternative pathways in which EU green-house gas emissions are reduced by 80% by 2050 relative to 1990. In Pathway A the current regime remains strong, and incumbent actors mainly search technology substitution responses to the current challenges. In pathway B, new actors come in creating a total regime shift with more radical response strategies and a focus on small-scale technologies. In transport, Pathway A may translate into a switch from gasoline to battery-electric vehicles. Pathway B could imply a focus on public transport or on slow modes (cycling and walking).

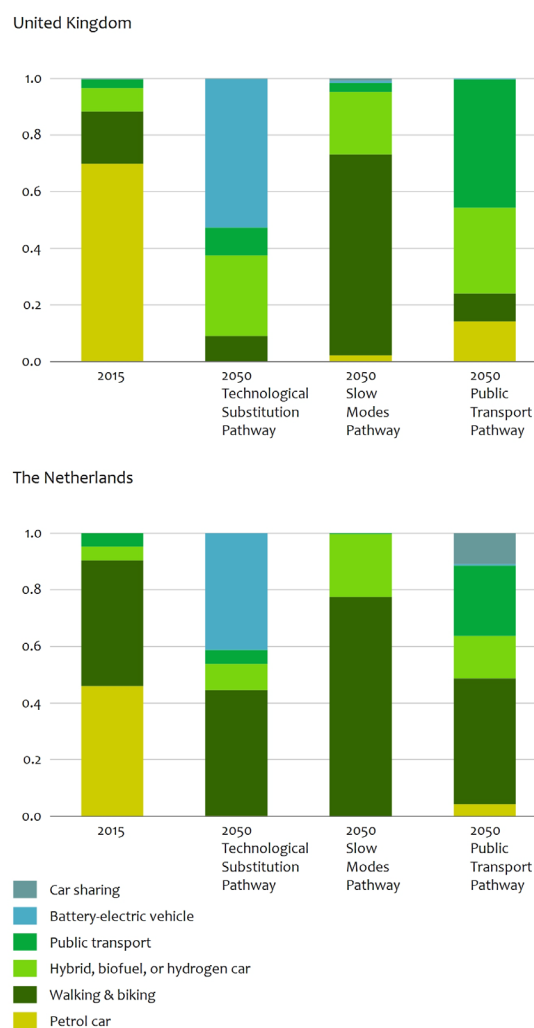
***A rapid phase out of the petrol car seems required. This will require a coherent, long-term strategic vision on mobility***

All pathways towards a low-carbon mobility sector require a rapid and almost complete phase-out of the petrol car in the next 2-3 decades (Figure 2). A phase out of petrol cars will require dedicated policies. This could include a gradual ban on the sale of petrol cars, providing infrastructure for alternative cars or transport modes, pricing mechanisms, tightening emission controls and call-back procedures. Interestingly, the current direction and speed of technology development of electric cars and hybrid vehicles (e.g. with respect to batteries) could make a transition easier than often included in the scenarios. At the same time, it can be questioned whether these scenarios provide enough attention to the associated infrastructural changes. All-in-all, phasing out petrol cars seems possible, but requires daring and ambitious policy-making for the collective interest. There are positive signs that the resurgence of interest in issues such as air pollution can contribute to reinforcing support for such a phase out. Moreover, also changing cultural attachments to automobility may help.

***The current emphasis on ‘greening’ through technological innovation overlooks re-orientation through behavioural and lifestyle change***

The four policy approaches listed in Table 1 are not mutually exclusive. In different national, regional and urban contexts, pathways to sustainable mobility will involve experimentation with different combinations of these strategies over time. Current policies in the EU for change in land-based personal mobility seem to emphasize incremental change and technological substitution: A ‘greening of cars’ strategy is

followed by most of the established actors involved. Industry tends to favor this gradual vision, as it is least disruptive to its core competences, and risk-averse policy-makers find it most suited to hedge against potential user discontent. Still, also pushing other strategies strongly would make it more likely to achieve the overall objective of a decarbonized passenger transport system by 2050.



**Figure 2** Change in mobility lifestyles according to the MATISSE-KK model. Source: Results from PATHWAYS project. For an explanation of the pathways, see text box on page 2.

***Strategies towards sustainability can be more successful implemented if they have support of several societal groups, including policy-makers, manufacturers, business, citizens and the financial sector***

Transitions in mobility are associated with enormous consequences in infrastructure (spatial planning, urban planning, fuel strategies). This means that, despite the short life time of cars themselves, a long-term vision will be required. Recent experience from historical case studies has shown the importance of actor alliances around shared normative goals in transport, both in positive and negative ways. In order for new, ambitious, visions towards sustainable transport to become effective these visions need to gain legitimacy and generate trust, based on 1) coherence and long-term thinking, 2) involvement of the general public in some form, and 3) connection to long-term policy commitments. Public pressure for policy to tackle environmental issues (conveyed by social movements) can then support consistent and deliberate policymaking strategies. Moreover, the expected impact of new technologies and behavioral practices (e.g. self-driving cars, alternative work styles) could provide opportunities for change.

***Experimentation can play an important role in enabling future transitions***

Experimentation allows local coalitions of activists and policymakers to become aligned to jointly deliver on community and policy goals, and eventually address the environmental challenges linked to mobility. In some instances, specific governance strategies need to be crafted to alleviate resistance, such as in the

case of ‘special status’ concessions for a fraction of car owners, or attractive rates for car-sharing and public transport to support ‘modal conversions’ of specific users.

***A diverse set of policy interventions are required***

Given the considerations above, there is no single instrument that will be sufficient to support a transition towards sustainable transition on its own. Instead, a combination of policy instruments could be successful, focused at integrating the various relevant policy areas, including energy policy, land use and infrastructure planning, innovation support, industrial stimulus, and consumer incentives. Examples of such arrangements might be market rules to restrict petrol cars in urban centers, new public service mobility providers that sell intermodal journeys via smart phones and the internet, or combined electricity supply and service packages for battery-electric vehicles. National governments can champion the role of local authorities in promoting slow modes in local areas. This includes the promotion of walking to work and walking to school schemes. It also involves promotion of cycling and cycling infrastructure. Much of this can be done in a preparatory way to change mobility habits and provide realistic alternatives to cars for a future transition to a slow modes system of transport provision.

## **Literature**

Banister D. (2008) The sustainable mobility paradigm, *Transport Policy* 15, 73–80.

## About the PATHWAYS project

The EU FP7 project PATHWAYS is a unique project that explores the possibilities for transitions to a low-carbon, sustainable Europe. The essence of PATHWAYS is that it combines the analysis of different scientific approaches: integrated assessment modelling, transition science research, and participative action research. By combining and coordinating information from these different approaches for selected cases, PATHWAYS aims at providing better policy advice for European, Member State and local policy-maker.

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