**CHAPTER 5:**

# REDUCING $CO_2$ EMISSIONS FROM URBAN TRAVEL: LOCAL POLICIES AND NATIONAL PLANS[1]

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## 1. Introduction

Urban areas are vital to the economic, environmental and social future of our world. Cities in OECD and International Transport Forum countries account for approximately 80% of the population and around 90% of economic activity. But cities have also attracted a growing number of problems that can drain their economic and social vitality, many of them transport-related: congestion and gridlock on urban roads, road accidents, $CO_2$ emissions, poor air quality and sprawl, to name but the major ones, as well as social fractioning due to poor access to economic and social activity.

Clearly, urban travel problems are not just a concern for local government.

Making travel in cities function better so that economic and social activity can flourish without the negative side effects of travel – making travel more sustainable – has grown as a national and local priority over the last few decades.

All of these urban travel problems constitute a varied set of challenges for decision makers in urban areas. Decision-making for sustainable urban travel is an increasingly complex exercise – with no one level of government solely responsible for all aspects of urban travel policy development and implementation. Indeed, government now takes fewer and fewer policy decisions on its own: private sector companies and agencies are increasingly responsible for many aspects of public transport, road construction and management and land-use planning and development.

### *Climate change and transport: A national and local priority*

With climate change at or near the top of most national policy agendas, increasing pressure is on cities to come up with solutions to contribute to overall climate change mitigation initiatives at a local level. A growing number of cities are making climate change a focus of policy initiatives, vying with transport issues as an area for attention. In other cities, reducing $CO_2$ emissions from transport is one of a wide range of objectives to improve the sustainability of urban travel, in addition to the environmental, land-use, safety and accessibility objectives listed above.

This discussion paper attempts to situate the problem of $CO_2$ emissions mitigation from urban travel in the context of a wider set of policy goals intended to improve the sustainability of travel in cities. It begins by briefly describing the problem of transport-$CO_2$ emissions, as well as policies to reduce $CO_2$ within the transport sector as a whole. The paper goes on in Section 4 to explore in general terms how sustainable urban travel policies can play a role in reducing $CO_2$ emissions. Section 5

points to a range of policy and institutional barriers that have made implementation of sustainable urban travel policies particularly difficult, contributing to persistently high $CO_2$ emissions from travel in cities. The paper closes in Section 6 by proposing a certain number of good governance initiatives – agreed upon by ministers of International Transport Forum countries in 2006 – that national and local governments can take together to improve the implementation of these policies and pave a path to better, more economically, environmentally and socially sound travel in cities.

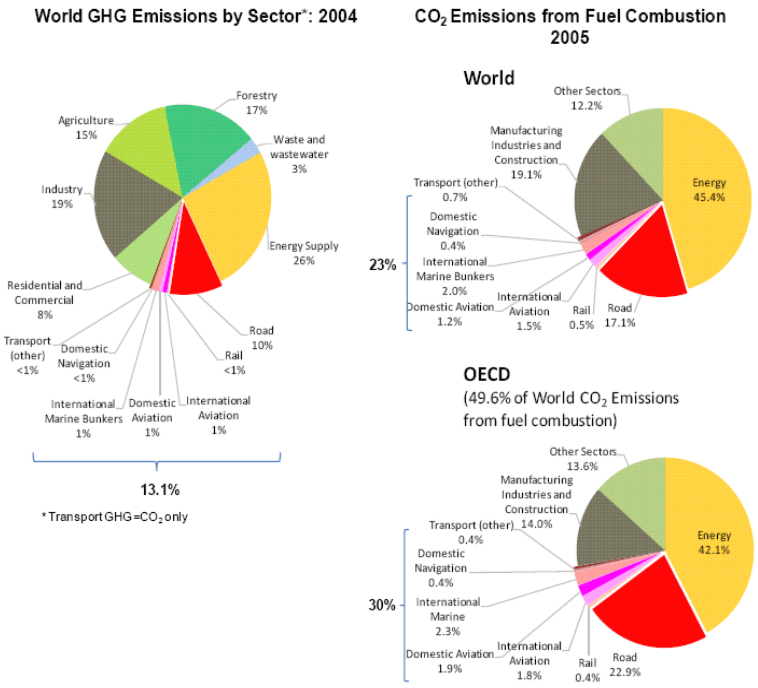
## 2. $CO_2$ emissions from transport: setting the scene[2]

Transport is a key driver of the economy: it supports economic development and growth, and facilitates exchange among countries. The transport sector is also, however, a significant and growing contributor to greenhouse gas emissions. Transport activity is responsible for 13% of all anthropogenic emissions of greenhouse gases and 23% of world $CO_2$ emissions from fossil fuel combustion – 30% in OECD countries. The sector is 95% dependent on oil, accounts for 60% of all oil consumption, and is therefore increasingly exposed to oil price instability and supply shocks.

In most countries, transport $CO_2$ emissions are growing faster than total $CO_2$ emissions: $CO_2$ emissions from fuel combustion in International Transport Forum countries grew 18% from 1990 to 2005, while transport $CO_2$ emissions grew by 23% over the same period. For OECD countries, these figures are 17% and 30%, respectively.

Transport activity varies greatly between countries and is growing at different rates. Car ownership, for example, varies from over 800 cars per thousand in the United States to less than 10 in India. Worldwide, car ownership is expected to triple between 2000 and 2050 (World Business Council for Sustainable Development, 2004). Projections for the future suggest continued strong growth in transport volumes in all modes, especially in non-OECD countries. Air passenger traffic is expected to be 2.5 times higher in 2025 than in 2005 (Boeing, 2007), and air cargo is expected to be three times higher in 2025 compared to 2005 (Airbus, 2007). Similarly, shipping volumes doubled from 1985 to 2007 and the fast-growing container sector is expected to triple from 2000 to 2020. Road transport accounts for by far the largest part of $CO_2$ emissions from the sector, and this will remain the case in the coming decades, despite more rapid growth in shipping and aviation (International Transport Forum, 2008b).

**Figure 1. Transport accounts for a significant share of $CO_2$ emissions**




*Sources:* $CO_2$ from Fuel Emissions, IEA, 2007; and National reports to the UNFCCC.

Finding the right balance between supporting the economic drivers of trade and mobility and reducing transport's energy intensity and emissions are among the top priorities on the policy agendas of most transport ministers today.

## 3. Policies and measures to reduce $CO_2$ emissions from transport

A diverse range of policy measures and instruments show potential for improving efficiency in and reducing emissions from the transport sector. These policy choices necessarily reflect the specificities of individual countries, which are approaching these problems from different starting points and under different economic, institutional, social and political circumstances.

If all measures currently proposed by countries are fully implemented, the projected growth in emissions can be reduced by over a third. Despite this, most indications are that transport emissions will increase by two-thirds over the next 30 years unless transforming technologies are developed. This presents an enormous challenge for the transport sector and calls for an urgent need for action. Studies and expert discussions show, however, that it is achievable in the long run. Meeting this challenge, moreover, will also provide promising new opportunities for business and industry (International Transport Forum, 2008a).

### *Focus on cost-effectiveness and energy efficiency*

Research conducted in the International Transport Forum (ECMT, 2007) has affirmed that cost-effectiveness (cost per tonne of $CO_2$ abated) should be the fundamental factor in determining which

policies to adopt and, for example, how much the transport sector should contribute towards economy-wide abatement goals. Some of the potential measures for the transport sector have relatively low costs; others higher costs at the margin.

Whilst carbon and fuel taxes are the ideal measures for reducing $CO_2$ emissions because they send clear economic signals and distort the economy less than any other approach, the largest transport sector abatement opportunities emerge from measures to improve energy efficiency; these include: improving vehicle fuel efficiency and efficiency of components and accessories (tyres, lubricants and electrical components) through regulation and labelling; promotion of fuel-efficient driving (eco-driving) via driver training and feedback instrumentation; support for improved freight logistics; better use of differentiated vehicle taxes, and fuel taxes.

***Key Messages of the 2008 International Transport Forum***

At the 2008 International Transport Forum, Transport Ministers agreed that countries should aim to develop a broad strategic policy approach – both within and across modes and at all appropriate levels of government – to improve energy efficiency in and reduce $CO_2$ emissions from transport. This approach should be consistent with and contribute to economy-wide climate change mitigation plans.

The Forum's *Key Messages* call for a package of policy measures to reduce transport-related $CO_2$ that includes: strengthened research into new technology and fuels, increased use of information technology and integrated mobility management, as well as a wide variety of non-technology policy tools with potential to improve economic efficiency and reduce emissions.

A major component of this policy package includes measures that encourage the travel behaviour changes needed to combat climate change and simultaneously meet other objectives of transport policy. These measures include: improved organisation and telematics to optimize transport modes and their inter-linkages; and more effective use of rail, inland waterway and short sea shipping for freight transport.

They also include a number of policy initiatives that specifically address travel in urban areas:

- Enhanced public transport and rail services;
- Support for non-motorised means of travel: walking and cycling;
- Measures to manage traffic demand;
- More efficient logistics concepts;
- Continued efforts to better integrate land use and transport planning;
- Pricing mechanisms to encourage behavioural change and ensure that externalities are taken into account (International Transport Forum, 2008a).

These measures all have potential to reduce $CO_2$ emissions from travel activity while simultaneously serving a wider set of objectives to improve the sustainability of urban travel (*e.g.*, congestion mitigation, improved air quality, better accessibility). In this respect, they offer *co-benefits*, which while clearly essential to a robust $CO_2$ mitigation policy for transport, have proved to be fairly difficult to quantify in terms of their exact contributions to $CO_2$ abatement.

They do nevertheless constitute the core set of tools at the disposal of local decision-makers to improve urban travel sustainability and reduce $CO_2$ from transport. Given that the vast majority of the population in OECD and Forum countries either already lives or is moving to urban areas, an increasing proportion of transport $CO_2$ emissions is generated in and around cities; therefore, as stated earlier, mounting pressure is on local authorities to draw on these policy tools to mitigate the impacts of urban travel activity on climate change.

Interestingly, there remains in many countries something of a disconnect between local policy initiatives to improve the sustainability of urban travel and reduce $CO_2$ emissions, and national climate change mitigation strategies, which in a number of cases either overstate the role of urban travel policies in meeting national objectives (often without quantifying the actual abatement potential of these measures) or assign little importance to the $CO_2$ mitigation potential of local policies. This may be attributed to specific local and national division of transport policy responsibilities – addressed in Sections 5 and 6 below. In any case, some degree of better co-ordination between transport policies set at different levels of authority would appear to be beneficial.

## 4. Tackling $CO_2$ in the evolving policy package for sustainable urban travel[3]

In 1995, the OECD and the European Conference of Ministers of Transport (ECMT), which became the International Transport Forum in 2007, together developed an integrated strategy for tackling a wide range of urban travel problems, including $CO_2$ emissions from transport (ECMT, 1995). In their report, the ECMT and OECD identified a wide range of possible policy solutions to urban transport problems, and stressed that a combined package of regulatory, pricing and technology measures, co-ordinated across modes, is needed to send the right signals to urban land use and transport markets.

Over the decade-plus since the 1995 report, a number of new policy instruments have emerged as important in the urban travel policy package, while others have met with less interest. Technological improvements to vehicles and fuels have helped reduce air quality problems and increase energy efficiency, and are seen as a key contributor to the reduction of greenhouse gases. However, it is clear that they will not, on their own, solve the environmental problems of urban transport. Total travel is still growing, and while cars have become more fuel-efficient, there is also a persistent trend towards larger and more powerful vehicles. Recent high energy prices have for the first time reversed this trend in some countries – notably the United States; however, this change may only be temporary.

While new transport infrastructure continues to have a place in overall policy, more emphasis has been placed on the need for cost-effective design and consistency with wider policy objectives. There has been a growing focus on better management of existing road and public transport networks in order to improve their quality and reliability. An increasing role for the private sector is likely as financing opportunities have tightened. to improve efficiency and encourage innovation.

Information provision is being used to greater effect. Information technology is now used more widely to support the needs of users, operators and network managers, while education, awareness and better co-operation have emerged as particularly promising means of encouraging individuals and firms to better manage or reduce their demands on the transport system.

Finally, the application of pricing schemes has received a substantial boost with the successful introduction of congestion charging in London and Stockholm, but how to transfer this experience to other urban areas – a question long asked about the much observed and prolifically documented road pricing scheme in Singapore – is not obvious.

Despite the growing number of policy instruments at their disposal, governments still place too much reliance on the supply-side measures of infrastructure and technology and too little on management, regulation, information and pricing. In cities that are at an earlier stage of motorisation, more emphasis on cost-effective transport demand management measures seems important. However, information on the performance of many of these demand-side measures remains limited.

Above all, further work within the Forum has re-emphasised the need for an integrated package of mutually reinforcing policies and measures that will help cities move toward sustainability. Effective urban public transport operations require an appropriate combination of service improvements, better management of the road network, improved information for users, appropriate fare structures and stronger price signals to car users. Benefits from promotion of non-motorised means of travel (cycling and walking) can only be realised when they are considered to be integral parts of the policy package – linked, for example, with improvements to public transport and the road network – rather than being relegated to the margins of urban travel policy as policy afterthoughts. Congestion charging in London has worked well precisely because it was combined with improvements in management of the road network and substantial enhancements in bus service.

**5. Implementing urban travel policies: the bumpy road to sustainability**

It is clear from the evidence outlined above that progress has been made in improving the sustainability of urban travel. Transport authorities, service and infrastructure providers throughout OECD and Forum countries have recognised that their problems are no longer just transport-related – that environment, spatial development and road safety impacts, for example, must be taken on board in policy-making. This has meant that the processes for decision-making have become more multi-sectoral, and that the analytical and methodological tools have been adapted to meet the needs of this increasingly complex decision-making environment.

But ensuring that integrated decision-making is a practice that works is a persistent challenge in most countries. Integration of spatial and transport planning, for example, widely acknowledged as essential to ensure sustainable development of urban areas, remains a remote objective for many cities. Urban transport planners and spatial planners still largely have difficulty finding a common language. even when policy and institutional structures are designed to promote and accommodate this interaction.

In its work on implementing sustainable urban travel policies, the Forum has identified a number institutional and policy barriers.

First, institutional weaknesses include lack of a national policy framework for improving urban travel; excessive or incomplete decentralisation; poor policy integration and co-ordination, and counterproductive allocation of responsibilities. Legal and regulatory barriers include a lack of enabling legislation for new policy instruments such as pricing, inconsistent fiscal frameworks and ineffective controls on the performance of private sector transport service providers. Financial barriers include limited budgets and inappropriate restrictions on the ways in which these limited funds can be used. Finally, many policy instruments have yet to be accepted whole-heartedly by the public and the media, leading all too often to insufficient political commitment.

Other barriers relate to the *process* by which sustainable urban transport strategies are developed and implemented, including: a lack of clear policy objectives; incomplete or inconsistent ex-ante policy appraisal, often concentrating exclusively on economic rather than on environmental and social impacts, and with different appraisal methods for different types of solution; likewise, incomplete or

inconsistent monitoring and ex-post evaluation of the impact of policies. Key to the whole process of strategy development is the persistent lack of consistent, coherent urban travel data.

Many of these barriers persist in many countries and must be overcome if effective sustainable urban travel policies are to be implemented.

### *Decentralising urban travel policy*

There has been a clear trend towards greater decentralisation of responsibilities for urban transport, with, for example, the Netherlands gradually transferring more responsibility and financial control from national government to cities since the late 1990s, and more recently, France devolving responsibility for urban public transport to its regional and local authorities.

Clearly, decentralisation plans such as these make sense in that they are designed to situate decision-making for managing car travel and public transport provision at the local level, where its impact is best understood. Problems can arise, however, when decentralisation is excessive or incomplete. This has been the case in a number of countries, notably (if not exclusively) several of those that underwent economic transition in the early 1990s, such as Hungary and Poland. Hungary, for example, found that too rapid a devolution of power left the central government unable to define a co-ordinated framework for urban transport, and local areas without commensurate resources to assume their new responsibilities (ECMT, 2004).

## 6. Making the national-local link for $CO_2$ abatement from urban travel

So in light of these policy and institutional barriers to implementing sustainable urban travel policies and measures, what specifically can national governments do to facilitate coherent, efficient implementation?

Following are some of the key findings of the work on implementation of sustainable urban travel policies undertaken to answer that question in the Forum and its predecessor, ECMT, over the last decade (ECMT, 2006).

### *A supportive national policy framework*

This remains an essential requirement if cities are to be able to introduce sustainable urban transport policies – particularly if these policies are to serve as important elements of a national $CO_2$ abatement strategy. National governments need to establish a high-level vision and goals for urban transport. This will provide a context for local government, which must be enabled to use the full range of policy instruments identified earlier in this paper. It will also help to ensure coherence among approaches taken by individual cities. National government also needs to employ policy levers such as taxation in ways that are consistent with its vision for urban travel. Finally, local governments need guidance on good practice and encouragement to enhance their performance.

### *Improved institutional co-ordination and co-operation*

#### *Horizontal co-ordination*

There is a pressing need at the national level for greater collaboration between the transport ministry and others (such as finance, planning, environment and industry ministries) that influence transport. The implementation barriers arising from inconsistent $CO_2$ abatement policies at a national

level are numerous, and ideally all ministries need to adopt a common policy approach to transport, which should be articulated by the Transport Ministry.

At regional and local levels, similar horizontal co-ordination is needed. One authority should preferably have responsibility for the full set of policy instruments, which can help achieve sustainability so that integrated packages can be effectively implemented.

Despite widespread agreement that spatial and transport planning need to be co-ordinated to ensure sustainable development for urban areas, it remains a remote objective for many cities. Urban transport planners and spatial planners still largely have difficulty finding a "common language," even when policy and institutional structures are designed to promote and accommodate this interaction. And with the other sustainability imperatives cited above (health, education and social inclusion, etc.) the integration task has become more complex.

Again, ideally, transport policies in the larger cities should be planned by one body for the whole travel-to-work area. Where this is not feasible, spatial co-ordination between adjacent authorities must be facilitated. Many types of regional or agglomeration-level transport authorities exist (*e.g.*, the "*autorités organisatrices*" in France, and the Metropolitan Planning Authorities in the United States) but in most cases are given authority only over transport planning, not control over land use.

*Vertical co-ordination*

Effective vertical co-ordination among the tiers of government is also essential. National, regional and local government must have common goals and objectives, with each providing a context for the next. National governments can achieve more by decentralising responsibility to lower tiers, but need to provide the necessary financial and advisory support and encourage collaboration. The decentralisation process undertaken in the Netherlands in the late 1990s and clarified for the transport sector in the recently promulgated National Mobility Policy Document is an example of how this can be done (ECMT, 2001). Research in the Forum has shown that organising and financing urban public transport is more efficient when the main responsibility for any one policy instrument is allocated to one tier of government.

*Public/private sector co-ordination*

Finally, clear co-ordination between the public and private sectors is needed, both in terms of investment in new transport facilities and in the provision of services. And single agencies responsible for the strategic planning and tactical development of all aspects of public transport can help, even if operations are split between several public or private entities.

***Effective public participation, partnerships and communication***

Public involvement must be encouraged throughout the policy process: from the identification of problems, through articulation of possible solutions, to acceptance of preferred strategies and support for their implementation.

Public consultation is not, however, always an easy undertaking. The London congestion charging experience demonstrates the value of preparing users for the introduction of new and controversial measures.

The media play an increasingly important role in influencing public acceptance, and public authorities need to fully engage with them to articulate a clear understanding of problems and the case for preferred solutions.

Another message emerging from the experience in London is that while public preparation was indispensable to the successful launch of the scheme, a clear political champion, embodied in the Mayor, was equally crucial to the scheme's early success. Political commitment at the mayoral level – observed perhaps most strikingly in the now-famous example from the 1970s of Curitiba, Brazil – has also been an important factor in the implementation of major changes to the public transport network in Paris – particularly the construction of exclusive bus lanes, as well as the extension of the tramway system.

These examples illustrate that strong political commitment is often a deciding factor in the success of policies designed to significantly change urban travel patterns.

***A supportive legal and regulatory framework***

Many countries have enacted strong legislation and regulation to support local implementation of urban travel policies and measures – particularly as concerns the organisation and financing of urban public transport.

In some cases, however, legislation is still needed to enable local government to apply certain types of policy instrument, particularly certain demand-management measures. In the United States, recent changes to transport legislation have made certain types of road pricing more feasible. Moscow has been challenged with difficulties in formulating strategies to manage demand where legislation is limited. The Japanese experience demonstrates how a highly de-regulated environment for public transport can function quite well under certain circumstances, though effecting improvements to the system may be more difficult, as policy levers are largely out of public hands.

Regulation needs to be consistent across transport modes and tiers of government. In particular, as mentioned earlier, there seems to be a clear case for some degree of competition in public transport – defined in a regulatory framework – whereby public agencies determine strategy and tactical planning of services, fares and information, and provide the context within which the private sector competes for the provision of efficient, high-quality services. One continuing challenge is the need to encourage and support innovation where services are procured through contracts with private operators.

A message emerging from the Forum's work on this topic is the importance not just of effective regulations but of effective enforcement of those regulations. All too often, controls on operators and users are made less effective by failure to devote resources to enforcement. This is particularly true, for example, with restrictive parking, speed limit and traffic calming schemes, which have limited effect if they are not backed up by robust enforcement measures. There is a strong case for involving interior ministries directly in this aspect of transport policy.

***A comprehensive pricing and fiscal structure***

A comprehensive pricing policy should include measures addressing public transport fares, parking charges and possibly charges for road use. The valuable role that direct pricing of road use can play for managing traffic congestion and raising revenues for public transport has been shown in London's charging scheme. This then set a challenge for governments to decide how widely such measures can be applied. At the same time, there is a need for greater clarity in the setting of fares,

with subsidies focused on those people in particular need, and more flexible pricing approaches, in order to encourage public transport use. Overall, pricing needs to be consistent across transport modes, with charges approaching the marginal costs of travel.

***Rationalised financing and investment streams***

Devolved financing needs to accompany devolved responsibilities, with governments providing finance that is secure in the longer term and providing flexibility in the use of those finances. Finance, and the appraisal processes that support it, needs to be carried out in a consistent way across all modes and types of policy instrument. Since budgets will continue to be constrained, greater emphasis needs to be placed on the most cost-effective solutions; the U.S. planning framework stresses the importance of financial realism in strategy development. There remains a case for identifying new sources of financial support, whether from hypothecation of charges for road use or from value capture from those whose property values rise as a result of transport investment.

***Improved data collection, monitoring and research***

Better urban transport data collection and monitoring involves identifying the types of data that are needed at each of the stages of the policy definition and implementation process; improving standards of collection; providing the finance to support data collection, and ensuring that the data collected, particularly by the private sector, is readily available for public use. Regular monitoring to understand trends and identify emerging problems is essential, as is benchmarking to help cities learn from one another and enhance their own performance. Finally, more consistent evaluation of new or innovative policy instruments is needed so that cities are able to learn from specific successes and failures. In particular, national governments can help to promote development of competence and skills among agencies responsible for regular data collection and monitoring.

***Support for appraisal, monitoring and evaluation processes***

Governments have a role to play – whether through technical, budgetary, or other means of support – in facilitating the development, appraisal, monitoring and evaluation process of integrated urban travel strategies at local or regional levels. Improvements to urban travel strategy development should then be monitored and evaluated to ensure the impact of this support.

***Conclusion***

The above recommendations have shown themselves through Forum research to be essential factors in the pursuit of transport sustainability in urban areas. With different starting points in countries shaped by a variety of factors – notably, decision-making structure, level of economic development, and size and density of urban areas relative to the country as a whole – there will clearly be no one approach to improving urban travel among OECD and Forum countries. The messages carried forward to governments in these recommendations, however, may provide insights into ways local and national authorities can identify and implement policies to reduce the impact of urban travel on climate change, and more generally, pursue together efficient, realistic, manageable strategies to improve the sustainability of travel in cities.

**ENDNOTES**

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1. Disclaimer: The views expressed in this paper are those of the author and do not necessarily represent the views or policy of the International Transport Forum or of its individual member countries.

2. The theme of the recently held 2008 International Transport Forum's was Transport for Energy: The Challenge of Climate Change. At the Forum, Ministers of Transport agreed to a broad set of key messages based on a set of research findings from which this section is drawn. Both the Key Messages and the Research Findings can be found at *www.internationaltransportforum.org/Topics/forum2008.html*.

3. Information in Sections 4, 5 and 6 is drawn from ECMT (2006).