Conclusions and Key Findings

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Workshop 2
Changing Behaviour in Passenger Transport

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Policy levers

Governments have several levers to help guide travel decision-making in a way that produces the largest benefits, including mitigation of greenhouse gas emissions, at the lowest possible costs. Salon and Sperling (2008) propose developing the appraisal and planning process to provide an integrated climate policy instrument for local governments in the form of city carbon budgets. This would mean integrating climate change policy with transport policy, using instruments that involve influencing the pattern of land use development, the intensity of car use and the efficiency of public transport systems. This approach combines an enforceable cap with the full freedom and flexibility to select locally appropriate measures.

The full range of levers include:

- Investment choice and financing for road and public transport networks;
- Pricing of parking, road use and public transport;
- Vehicle and fuel taxation;
- Rules regarding traffic, parking, access and use of the network;
- Transport infrastructure planning and its coordination with relevant land-use planning systems;
- Policy appraisal processes and methodologies, which have a real impact on transport decision-making.

Transport authorities have in the past largely treated travel demand as an exogenous factor that simply must be catered for, resulting in a series of “predict and provide” infrastructure development projects. A growing realisation that such policies not only meet demand, but spur it as well, and that catering to demand when prices are below social costs eventually is ineffective, has led many authorities to re-assess their approach. The construction of new roads or the freeing-up of existing capacity leads to a decrease in travel times and thus to a decrease in the generalised cost of travel. Consumers respond to this by adapting their trip-making frequency, patterns and mode choice. The “induced” impact of new capacity is not bad in itself as it can reflect suppressed demand but it can erode the expected benefits of road construction or widening schemes. The induced travel effect can also come into play as a result of any successful policy to draw cars off the road which, without flanking measures, increases available road capacity. Conversely, reductions in available road capacity have been found to have lasting impacts in reducing traffic demand. As in other sectors (electricity, water) there is a growing focus on managing demand for transport infrastructure to contain the negative consequences of unmanageable traffic growth.

The potential to change passenger behaviour

Goodwin (2008) notes that although travel behaviour is sometimes described as ”too difficult to change” there are very many kinds of behavioural choice. These are in constant flux and subject to a wide range of incentives. A key point often overlooked by policy is that net trends in transport demand often hide significant changes in specific household behaviour. A net increase in passenger kilometres of 2% might hide the “churn” resulting from an important number of households decreasing their travel (-20%) as compared with those increasing their travel (+22%). Goodwin cites evidence to suggest overall reductions in car use of up to 20-30% are possible. Tony May (May, 2008) also points to a potential of -20% car travel in European urban areas from the deployment of a comprehensive and self-financing package of measures.

There are many more travel choices over and above choosing between cars and public transport, including the volume and location of travel, using other modes notably walking and cycling, driving style, car ownership, and where to live and work and shop. In general responses are often rather small in the short run, but build up to very much more flexible life-style choices in the longer run, in which habits are eroded and new ones form. There is a large volume of empirical and case study evidence about the effect on travel behaviour of changes in price, speed of travel, quality of travel, information availability and other factors which can be influenced by public or private interventions. A common characteristic is that these interventions have mostly been chosen for objectives other than carbon reduction, including congestion reduction and quality of life improvements. Where such interventions produce net benefits there are carbon benefits for zero real resource cost.

Available studies on fuel price elasticities over the short- and long-run[1] show clear and emerging regional differences, but there are two principal findings that are both robust and important:

- The main response to increasing fuel prices is to decrease fuel consumption (via vehicle choice, vehicle size choice, changes in driving styles) rather than decreased car travel. The elasticity of fuel consumption is at least twice as high as the elasticity of travel volume.
- Long-term elasticities are at least twice as long as short-term elasticities which indicates that many behavioural responses (vehicle

[1] 5 to 10 years.

purchases, housing and job decisions, etc…) take time to have an impact. This holds true for both the elasticity of fuel consumption and of travel volume.

Goodwin's summary of elasticity values (Table 1) differs from those found from a recent comprehensive study of responses to fuel price changes in the United States (Small and VanDender, 2007). Lee (2008) also finds lower short-run traffic volume elasticities with respect to fuel price than the Goodwin review, ranging from -0.078 to -0.171 for the greater metropolitan Seoul area depending on the alternative modes to the car likely to be chosen – bus, subway or a combination of the two. While there is no clear explanation for the difference in estimated elasticities, there are several plausible factors that likely play a role. The principal factor is the income effect – the United States has higher per-capita income than many of the countries whose elasticity values are referenced by Goodwin et al. Per capita incomes have risen in the United States as fuel price elasticities have fallen, as can be seen from the Small and Van Dender's estimates for 2000-2004. Higher incomes cause the share of fuel expenditures in total expenditures to decline, which may lead to lower elasticities. Higher incomes also lead to higher values of time, so that time costs of travel become relatively more important than fuel costs. Higher fuel costs then translate into proportionally smaller increases in the generalized price of travel (which is the sum of time and money costs), and assuming that drivers respond mainly to this generalized price, this reduces the elasticity with respect to the money costs. Note, however, that by the same logic higher fuel prices will lead to more elastic responses, which is consistent with the large effect that current fuel prices are having on the sales of relatively fuel-intensive light trucks in the USA.

Small and Van Dender's results suggest that fuel consumption by passenger vehicles has become more price-inelastic over time, and that it is increasingly dominated by changes in fuel efficiency rather than in amount of driving. Their results identify two main reasons for this: rising incomes and falling real fuel prices. One of these – rising incomes – can be presumed to characterize the future as well, even if falling real fuel prices probably cannot.

Lee finds that the cross-elasticity of public transport fare prices to car travel is insignificant whereas car users' responsiveness to changes in parking prices measured in terms of car travel volume is greater than their responsiveness to fuel prices, highlighting the importance of parking policy over public transport fare policies in seeking to change overall volume of car travel.

Table 1. **Review of Recent Fuel Price Elasticities**

		Short-term	Long-term
Goodwin, Dargay and Hanly (2004)			
Summary of 69 Studies undertaken from 1992-2004	Fuel Consumption	-0.25	-0.60
	Traffic Volume	-0.10	-0.30
Small and Van Dender (2007)			
US 39-year cross-sectional time series of data at the State level (1966-2004)			
1966-2004	Fuel Consumption	-0.074	-0.363
	Fuel Intensity	-0.035	-0.193
	Traffic Volume	-0.041	-0.210
2000-2004	Fuel Consumption	-0.041	-0.237
	Fuel Intensity	-0.031	-0.191
	Traffic Volume	-0.011	-0.057

Effects of "Soft" Influences on Travel Choice

Recent research has examined measures that change behaviour without changing the speed or cost of travel but instead seek to provide better and more targeted information to travellers on travel options. Cairns (2004) in a review of the literature found that such measures coupled with new opportunities to change behaviour arising from teleworking, car pooling, school travel plans etc., could result in a reduction of urban peak-hour road traffic of as much as 21% in the UK (11% nationwide) given sufficient support. However, these studies often target small groups of travellers and it is unclear whether these results can be scaled up to the population at large.

One clear finding on the psychological determinants of travel behaviour is the importance of habit in travel decision-making. Goodwin (2008) notes that people rarely base their daily travel habits on reasoned best-interest after weighing all the travel options available to them, even when they have all the necessary information on travel costs and options. Travellers are more likely to make decisions by force of habit. Thus interventions seeking to change travel behaviour should focus on providing information at those times when travellers are developing new heuristic rules or travel habits (e.g. when moving into a new area, when acquiring a driving licence, when changing jobs, etc). This finding may be of particular interest for policies seeking to develop public transport use. Information campaigns in the context of mobility management initiatives in the workplace have proven to be particularly effective in this context.

Ecodriving

Ecodriving has become a key element of national strategies to reduce CO2 emissions in a number of countries. Ecodriving has significant potential to deliver CO2 reductions quickly and cost-effectively; there appears to be a savings potential of 10 percent of surface transport sector emissions. Critics of ecodriving state that it is difficult to keep the habit once the training is over, especially in case of private drivers where economic incentives are not as obvious as in case of commercial operations. However, in-car equipment such as gear shift indicators, cruise controls and on-board computers giving feedback on fuel consumption help improve fuel economy. Instrumentation alone can deliver around five percent savings and provide and incentive to maintain and even improve driver performance after training. Cars are increasingly equipped with on-board computers that have an instantaneous fuel consumption readout function. Making this the default display would be a cheap and effective way to promote fuel-efficient driving. Introducing more advanced technology to run cars in an ecodriving mode as standard could achieve significant fuel savings. Ecodriving is already required to be taught to novice drivers under EU regulations. Testing ecodriving skills as a part of the driver licensing examination might result in significant CO2 emissions savings (ITF 2007).

Avoiding Oversimplifications

Travel behaviour is embedded in a web of other behaviours and decisions (Bonnafous 2008). It cannot be dissociated from work, housing, household, leisure and other social and economic systems that have an impact on the number and nature of trips taken. Isolated measures that seek address only one component of travel decision-making may have unintended consequences due to the complex interactions involved – e.g. measures to reduce work-related trips can lead to an increase in leisure-related trips. Another example of counter-intuitive policy outcomes are parking restriction measures to reduce the number of car-trips lead to an increase in increase in congestion due to “cruising” for rare parking spaces. Some basic and transparent accounting for the complexity of trip-making decisions must be integrated into transport and land-use policies to avoid the most extreme unforeseen consequences.

Policies seeking to influence travel behaviour – especially fiscal and pricing policies – have a real impact on the distribution of costs and benefits. Policies that might bring about the greatest change in behaviour and those that are most efficient from an economic perspective may not be the most fair from a social perspective. This finding cannot be ignored since the acceptability and the durability of pricing and fiscal policies often hinges on it. Impacts on lower-income households that are "captive" automobile users are particularly sensitive. Flanking measures that address the redistributive impacts of pricing and fiscal policies are important. At the same time, one may question whether distributional objectives should be pursued through transport policies and whether efficiency improvements in transport should be given up because of distributional issues. Other policy instruments, targeting income distribution, appear more suited to attaining equity targets.