



Private Transport Policies to meet the UK 2050 Carbon Budget

Policy summary

In 2008 the UK passed a Climate Change Act, which committed the government to an 80% reduction in greenhouse gas (GHG) emissions by 2050 from a 1990 baseline. In order to manage the trajectory of such a significant reduction, a system of five-yearly carbon budgets was included in the legislation. Carbon budgets set a quantitative limit on emissions within the specified period and describe the range of policies to stay within this limit. Particularly important UK sectors for the purposes of emissions reduction are energy generation, industry, and transport. Whilst emissions from the former two have fallen over the past decade, those from transport have increased slightly. This poses a major policy challenge, as carbon budgets tighten over time.

The Setting

The UK transport system is dominated by the private car. In 1960 49% of passenger km were travelled by car, van, or taxi. By 1970 that proportion had grown to 74%, then to 79% in 1980, 84% in 1990, and 86% in 2000. The increased ownership and use of cars has had profound social, economic, environmental, and cultural effects over the past century. Cars also produce a significant and growing proportion of GHG emissions within the UK; surface transport accounts for 19% of GHG emissions and 22% of CO₂ emissions. Of this CO₂, 60% is from cars. On both the roads themselves and the policy debates that surround them, cars tend to crowd out other modes of transport.

The fourth carbon budget, agreed by parliament early in June 2011, proposes a 90% reduction in GHG emissions from private transport by 2050. This will clearly require transformational change to the sector. More than just technologies will need to alter, as such a target raises questions about the structure and behaviours characterising UK transport. For example, the desirability of continued rises in demand for car travel and increases in car ownership can be challenged. At present, the government's stated policy approach concentrates on the adoption of new technologies, notably electric vehicles. This sidesteps the potential debate on the different forms the 2050 transport system could take.

The Analysis

What potential policy options exist for radically reducing GHG emissions from private transport? In addition to facilitated technological change, emissions reductions could be promoted through fiscal or quantity-based instruments. Given the 2050 timescale and consequent uncertainties and data gaps, multi-criteria analysis (MCA) was chosen to evaluate the options. Multi-criteria analysis is a methodology originating from game theory and combining elements of qualitative and quantitative analysis. Options are selected for evaluation, criteria are chosen to score each option against, criteria are weighted, then options are scored. The weighted scores can then be presented to allow comparison. The most accessible form of multi-criteria analysis is the linear additive model, which is used here. Although MCA requires judgements to be made where information is insufficient or absent, these are shown clearly and can be sensitivity tested.

The Briefing Papers series by 4CMR provides policy makers, organisations, communities and citizens with advanced research on the roles of economic, energy and environmental strategies for reducing the risk of climate change.

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The policy options chosen for evaluation were:

- Facilitated technological change through subsidy, without demand management.
- Reinstatement of the fuel tax accelerator, with hypothecation of revenues into low carbon mobility.
- A nationwide road pricing scheme, with hypothecation of revenues into low carbon mobility.
- A tradable fuel permit system, with hypothecation of revenues into low carbon mobility.

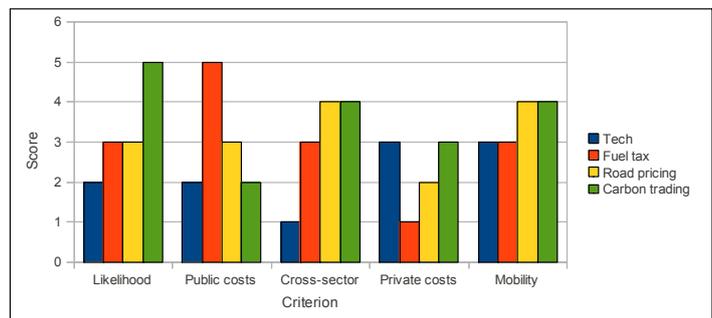
Each was scored on a scale of one to five against the following criteria:

- Likelihood of meeting the 2050 target for private transport GHG emissions.
- Net cost to the public sector.
- Cross-sector impact on GHG emissions.
- Private costs of motoring.
- Overall resulting mobility across all transport modes.

The resulting unweighted scores are shown in the figure here for comparison.

Conclusion

Evaluating transport policy options based on different assumptions from those of standard transport modelling leads to very different conclusions. For example, placing value on improved mobility by creating a more diverse, less car-dependent transport system is critical to the analysis. The evaluation suggests that carbon trading is the preferable policy option, whilst assisted technological change scores lowest overall. When high transaction costs are assumed for carbon trading, however, its total score equals that



Relative performance of four potential policy measures against five performance criteria.

of road pricing. These results cast serious doubt on justification for the current government strategy. The low total score for facilitated technological change largely results from it being least likely to meet the 2050 target and having the greatest cross-sectoral impact.

It is clear that reducing GHG emissions from car travel will have different effects depending on the instrument used. Policy makers thus have scope to choose how costs will be distributed across sectors and across the population, which will itself shape the transport system. The relative political acceptability of each option is not included in the evaluation, as outside academic literature their potential is little discussed. Without a wider public understanding that a range of options exist, opinion cannot yet be gauged.

The Cambridge Centre for Climate Change Mitigation Research (4CMR) studies the interconnected economic, energy and environmental policies at the heart of climate change policy.

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