



Knowledge Review of the Social and Distributional Impacts of DfT Climate Change Policy Options



Summary Report to Department for Transport

ED46894

Issue Number 1

June 2011



Title	Knowledge Review of the Social and Distributional Impacts of DfT Climate Change Policy Options
Customer	Department for Transport
Customer reference	SRE002
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File reference	
Reference number	ED46894 - Issue 1

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Knowledge Review of the Social and Distributional Impacts of DfT Climate Change Policy Options

Summary Report

BACKGROUND

This is the summary report of the project "*Knowledge Review of the SDIs of DfT Climate Change Policy Options*" for the Department for Transport (DfT), which was undertaken by a team led by AEA partnered by TTR and Dr Karen Lucas from the Transport Studies Unit at the University of Oxford. It began in September 2009 and the research ended in January 2010.

Aims of the research

The three main aims for the research were:

- i) To identify the potential social and distributional impacts (SDIs) of a predefined set of climate change policies for transport;
- ii) To identify how these SDIs are likely to play out in practice, e.g. the impact on the transport behaviour and carbon dioxide (CO₂) emissions of particular groups, and what the public's attitudes might be to these various measures;
- iii) To identify the gaps that remain in the evidence base and to propose ways in which these might be filled.

A systematic review of the literature was undertaken and where evidence was not identified, but it was possible to infer findings, this was done. The literature reviewed included reports undertaken by, or for the DfT, as well as reports undertaken for other public authorities and academic papers and research reports.

The climate change policies

The climate change policies for transport that were considered in the project were those that are the responsibility of the DfT. In this respect, the list of policies considered were those that were being discussed in the context of reducing transport's CO₂ emissions. The four core areas considered were policies that:

- i) **Reduce trips**, i.e. reduce the number of passenger kilometres travelled.
- ii) **Improve the utilisation of vehicles**, e.g. car sharing, and **change transport mode** to use less carbon-intensive modes.
- iii) **Stimulate the purchase and use of more efficient vehicles and driving behaviour**. This covered i) policies that aim to improve the efficiency of new vehicles, e.g. reducing their average CO₂ emissions per vehicle kilometre, and that stimulate the purchase and use of these vehicles; and ii) policies that aim to improve the efficiency of the way in which vehicles are used.
- iv) **Stimulate the use of alternative fuels**, i.e. policies that aim to reduce the carbon intensity of transport fuels.

However, the following policies, which have the potential to be used to reduce transport's CO₂ emissions, were **not covered** by the project:

- Policies such as fuel or vehicle taxation or spatial planning that are the responsibility of other government departments.
- Policies of the DfT, such as the provision of infrastructure or the regulation of speeds, that are generally implemented for reasons other than impacting on transport's CO₂ emissions.

Additionally, the project focused on land-based passenger transport, so freight transport and air travel were not covered.

The aim of implementing climate change policies for transport is to affect the behaviour of all (or some) transport users in a way that reduces transport's CO₂ emissions. As is widely recognised, this clearly has the potential for co-benefits, e.g. in terms of reduced emissions of air pollutants from transport. However, it is also important to consider what adverse social impacts such behavioural change may cause and, particularly, whether these impacts differ according to different groups within society, i.e. whether there are any social and distributional impacts.

Definition of social and distributional impacts

The definitions of social and distributional impacts used were²:

Social impacts relate to impacts on individuals and society, including the effects on communities, such as cohesion, people's way of life, the environment, health and well-being and personal fears and sense of security.

Distributional impacts relate to the extent to which there are differences in the impacts of interventions across different groups in society, such as on households with different levels of income, as well as impacts at different geographical locations.

An SDI occurs when both of these effects occur. The importance of monitoring for SDIs is to identify whether some social groups, and/or people in certain geographical locations, might be disproportionately affected by a given policy intervention, so that the introduction of mitigating measures might be considered.

It is also important to distinguish between the impacts on "transport users" and "non users", as the impacts on these groups will be different. For example, policies to reduce the affordability of transport could significantly impact adversely on transport users, whereas there are potential benefits to non users, i.e. people who are experiencing the adverse effects of the transport system, from reduced traffic levels.

Why are we concerned with potential social and distributional impacts of the DfT's climate change policy options?

The consideration of the potential SDIs of the DfT's climate change policy options is important so that such policies do not conflict with the wider social objectives of transport policy. The 2003 report from the Social Exclusion Unit made it clear that there are people who are already economically and socially disadvantaged within UK society and that these people tend to most negatively experience the worst adverse effects of the transport system. This is not only in terms of increased levels of exposure to noise, poor air quality, severance and crime but also reduced access to life enhancing opportunities, such as well-paid employment, a high standard of education and well-equipped health care services. Evidence for existing differences in the way in which different groups experience the transport system was obtained from the *National Travel Survey*³ and the *Family Expenditure Survey*⁴, as far as was possible. It is therefore important that such groups are at least not further disadvantaged by the DfT's climate change policies, and at best that their current levels of disadvantage are recognised and reduced by such policy instruments.

Additionally, acknowledging the potential adverse SDIs of climate change policies, and taking measures to address these in policy design and implementation, will help to increase the public acceptability of such policies. In this respect, it is necessary to ensure that the communication of the rationale, potential impacts and benefits of such policies is clear and targeted appropriately. Clearly, there are potential barriers to the implementation of many of these policies, including the public

² Summarised from the definitions given in DfT (2010) *Summary Guidance on Social and Distributional Impacts of Transport Interventions* In Draft; see www.dft.gov.uk/webtag/documents/index.php. It had been anticipated that the guidance would have been finalised in April 2010, but this was still not the case at the time of writing (mid December 2010).

³ See <http://www.dft.gov.uk/pgr/statistics/datatablespublications/nts/>; the 2008 NTS was used in this report, as that was the most recent version that was available at the time of the initial analysis. However, a more recent version of the report has since been published in September 2010.

⁴ See <http://www.esds.ac.uk/government/fes/>; the 2008 version of the FES was used in this report; a more recent version of the report was published in 2010 after the analysis for this report had been undertaken.

acceptability of pricing policies and car sharing. However, these were outside of the scope of this report⁵.

RESEARCH FINDINGS

For each of the categories of policy instrument, the key findings with respect to potential SDIs, knowledge gaps and implications for policy makers are presented below. In order to improve the evidence base, it is suggested that action is undertaken to fill the knowledge gaps in order to ensure that future climate change policy for transport does not have adverse SDIs.

Transport policies focusing on reducing trips

Key findings:

1. Policies that aim to reduce transport's CO₂ emissions by reducing trips have the potential for significant SDIs, particularly on the **affordability** of transport and the **accessibility** of different groups, particularly low income groups and those living in rural areas. Those likely to be worst affected are those with no viable alternative to the car, although exemptions and concessions could help to at least minimise such impacts. The public recognises that issues of fairness will be important in introducing road pricing policies.
2. On average, such policies (e.g. **congestion charging** and **parking charges**) are often considered to be progressive (i.e. impacts relatively more on those on higher incomes), particularly if the revenue raised is used to fund improvements in modes that are used more by those on low incomes, the young and old, e.g. buses. This is due to the fact that higher income groups own and use cars more than those on low incomes. The groups that are potentially most adversely affected by such policies will be those low income drivers who do not have alternatives to using their car, e.g. whose jobs are in the affected zone, but who live outside of this area.
3. **Personal carbon trading**⁶ could have similar, or even more adverse, SDIs as other policies aimed at reducing trips. However, if the policy is designed appropriately, e.g. if a certain level of allowances were distributed for free, then there is the potential for beneficial and equitable impacts across different groups.
4. Policies such as those above that aim to reduce trips by reducing the affordability of car use are likely to **deliver benefits for transport users and non users** alike in terms of improvements in air quality and reduced noise levels, severance and road traffic accidents that result from less traffic. However, such benefits will be marginal, and difficult to measure, at the individual level, but could be significant when assessed across the wider population.
5. There is the potential for **rebound effects** from policies that aim to reduce traffic levels, as the road space that has been freed up could be used for new journeys. If such effects are allowed to occur, this would undermine any benefits in terms of addressing SDIs that had resulted from the implementation of the policies. This underlines the importance of "locking-in" the benefits of local measures.
6. The majority of people in all socio-demographic groups are in **favour of individuals trying to limit their car use** for the sake of the environment. Around half would be prepared to walk instead of drive for shorter journeys, while around 40% were prepared to eliminate some non-essential car trips.

⁵ It is worth noting that general issues that need to be considered in encouraging the types of travel behaviour implied by the policies explored within this report, including how to overcome barriers, are covered in other research for the DfT (Thornton *et al.*, 2010); see <http://www.dft.gov.uk/pgr/scienceresearch/social/climatechangetransportchoices/>

⁶ Personal carbon trading is a policy that is analogous to the emission trading schemes that are used to reduce emissions from industry, e.g. the EU's emissions trading scheme. Under such a policy, each person would be allocated (or would have to buy) permits to travel (or emit CO₂) and the maximum distance that a person could travel (or the maximum amount of CO₂ emissions a person could be responsible for) would be capped. The total permits allocated would be set to ensure that wider CO₂ targets are met. If any individual travelled less (or emitted less CO₂) than the permits they had, then they would be able to sell these additional permits to those who wanted to travel more (or emit more CO₂).

Knowledge gaps:

- There is clearly the potential for those **on low incomes and traditionally transport disadvantaged groups** who own and drive cars to **be disproportionately affected by policies to reduce trips**, but there is little evidence as to the extent to which this would happen. This is linked to the fact that the scale of impacts will be dependent on the location. It is important that these potential impacts are understood for the particular location, and that policies to mitigate the adverse SDIs are put in place in parallel.
- **How best to engage the public in the development and design of instruments to reduce the number of trips.** Evidence suggests that on average it is likely that those on low incomes will benefit from such schemes, as bus reliability could increase and air quality could improve. However, it has proved to be difficult to convince people to support such schemes, even though when surveyed a majority of people appeared to be in favour of reducing their car journeys.
- **Designing schemes to address the genuine concerns of low income drivers.** Low income drivers spend more on transport than other drivers and also use other modes less often than other lower income households. Such drivers often have concerns regarding the impact on the affordability, and the subsequent impact on their personal accessibility, of pricing schemes. It is the needs of these drivers that should be considered in more detail when such schemes are developed.
- **The benefits of the Webtag guidance.** The Webtag guidance that sets out the approach to the implementation of local transport schemes includes guidance aimed at local road pricing schemes, as well as guidance focusing on the evaluation of SDIs. These documents were in the process of being revised in 2010. Given the potential significance of such instruments on the affordability of transport for low income car drivers in particular, as well as the likelihood that instruments to reduce trips will become increasingly common, it is important to monitor the application of the particular units of Webtag guidance to ensure that the potential SDIs of road pricing schemes are being considered and mitigated as far as possible in the design and implementation of such schemes.
- **What package of measures will best lock-in the benefits of charging and pricing schemes.** In order to ensure that the benefits of pricing and charging schemes are maintained, packages of measures have to be designed to ensure that any reduction in traffic levels is maintained.

There are a couple of general implications for policy makers that are of relevance to all of the policies considered within this report:

- **Understand** the type, scope and geographical location of the **disadvantaged groups** that might be affected. **Engage** with such groups, or at least their representatives, to understand their concerns, particularly with respect to accessibility and affordability. **Take such concerns into account** when designing policies, and communicate to disadvantaged groups how their concerns have been met. In this respect, the Webtag guidance on road pricing and assessing SDIs is relevant⁷.
- **Monitor** the impact of policies on different groups over time in order to ensure that the benefits are maintained, particularly in relation to adverse SDIs, and that additional measures are taken to address any erosion of the CO₂ and SDI benefits.

Implications for policy makers relating to policies to reduce CO₂ emissions by reducing trips:

- Focus on the potential impacts on **low income drivers**, particularly those who have a lack of viable alternatives to the car at the times at which they need to drive, or to the locations to which they need to drive.
- Consider the use of **exemptions or concessions** when addressing the concerns of disadvantaged groups, e.g. exemptions from the charge; direct compensation to low income groups, such as credits (similar to credits provided to low income utility customers); or tax credits to low income commuters.
- Take account of the **alternatives to travel**, and potentially improve these, as a means of addressing the concerns of potentially disadvantaged groups.

⁷ See respective guidance documents at www.dft.gov.uk/webtag/documents/index.php.

- Ensure that the resulting reductions in transport's **CO₂ emissions are maintained**. Measures that reduce trips potentially free up space for new additional trips, at least in the medium-term, which could undermine the CO₂ reductions that were achieved. In this respect, complementary measures are also needed in order to ensure that the CO₂ benefits of the original policies are "locked in".
- Take account of, and communicate, the **wider benefits** of such policies for transport users and non-users in the course of developing policies, e.g. improvements in air quality and reduced noise levels, severance and road traffic accidents, that result from less traffic.

Transport policies focusing on modal shift and increasing vehicle utilisation

Key findings:

1. Policies that aim to reduce CO₂ emissions through **modal shift** are more likely to improve the ability of those on high incomes and men to **access** employment opportunities and services, if they focus on improving rail or cycling infrastructure. In contrast those on low incomes, women, younger and older people will benefit more if such policies focus on improvements to bus infrastructure and services. There is the potential for policies to benefit all groups, depending on how a policy is designed. There is also a risk that the development of large-scale transport infrastructure is more likely to impact adversely on those living in more disadvantaged areas, if the infrastructure passes through rather than serves such areas. The exact nature of the impacts will depend on the locations that the infrastructure serves and passes through.
2. Policies that increase the amount of walking and cycling (in any group) have the potential to **improve physical fitness**, while if reduced traffic levels result from modal shift policies, there will be **wider benefits** in terms of improved air quality and reduced levels of noise and severance.
3. The **regulation of fares** has the potential to benefit all groups, but it is a less well targeted measure than **concessionary fares**, which could be used to benefit particular groups, as it has the potential to improve the **accessibility** to employment and local services for these groups.
4. There is insufficient evidence regarding the impact on the travel behaviour of different groups from **car clubs and car sharing**. However, such policy instruments clearly have the potential to benefit some groups by improving the **affordability** of accessing a car, and therefore their **accessibility** to services and social networks that are more easily accessed using this mode. For example, policies to stimulate car clubs could benefit those on low incomes who are not able to afford to own a car or those who would otherwise not have access to a car at certain times, e.g. mothers whose partner uses the household's only car during the day, as long as these policies encourage take up and ensure that these schemes are affordable.
5. Any of the policies that aim to encourage modal shift or to increase car occupancy have the potential to increase the capacity of the transport network and thus, potentially transport's CO₂ emissions, which would undermine the objective of reducing transport's CO₂ emissions. Hence, **complementary measures would need to be used in parallel**, such as those measures that could be used to reduce the number of trips (see above), in order to ensure to both tackle transport's CO₂ emissions and address SDIs.

Knowledge gaps:

- **How best to target measures to encourage those in disadvantaged groups to gain the benefits from cycling and rail use.** While in theory everyone could benefit from policies to stimulate cycling and rail use, at the moment it is more likely that men and those on high incomes would benefit due to existing patterns of use.
- **How best to ensure that modal shift occurs.** While the improvement of non-car modes is important in stimulating modal shift, it is important to identify the packages of measures that are needed to ensure that modal shift to more CO₂-efficient modes occurs and is maintained.
- **How to translate public support for using non-car modes into use.** There appears to be support for the use of other modes, but this support is not always translated to reduced trips in practice. The barriers to the use of non-car modes need to be understood better and then these can be overcome in the development, design and implementation of policies.

- **How best to target transport CO₂ emissions and address SDIs through increasing car occupancy.** Evidence suggests that, at least in the short-term, there are potential social and climate change benefits to be achieved from increasing car occupancy. However, the extent of the benefits that can be achieved is not clear. Those who first replace their car with a car club membership might contribute to an overall travel reduction as a result of the introduction of car clubs, on average. However, it is not clear what proportion of the population could join a car club and enable that car club to reduce average CO₂ emissions and deliver increased accessibility for those who previously did not have access to a car.

Key implications for policy makers, in addition to the general implications noted above:

- Ensure that the **barriers to access are overcome** for potentially vulnerable groups, particularly with respect to policies that aim to improve rail and cycling infrastructure and services, as both have a potential role to play in tackling transport's CO₂ emissions and addressing and mitigating SDIs.
- Ensure that the resulting modal shift or increased vehicle occupancy does **deliver CO₂ emissions reductions in transport**, or at least does not increase these emissions. Whether an actual reduction in total transport CO₂ emissions occurs would depend, at least in the medium-term, on the balance between the impact of any modal shift and the impact of any trips generated by the fact that successful modal shift will have freed up infrastructure that could be used by new motorised trips. Such rebound effects need to be taken into account in the development and implementation of policies in order to ensure that the desired CO₂ reductions are delivered and that any beneficial impacts on SDIs are maintained. Again, mitigation measures are important in this respect to ensure that the CO₂ reduction and other benefits are "locked in".
- **Understand** the net travel impacts of measures to stimulate car clubs and car sharing in order to ensure that both measures deliver their potential contributions to tackling transport's CO₂ emissions and in addressing and mitigating SDIs.

Transport policies focusing on stimulating the purchase and use of more efficient vehicles

Key findings:

1. Many of the policies focusing on stimulating **the purchase and use of more efficient vehicles**, such as *the EU's passenger car CO₂ Regulation* and *electric car cities*, aim to increase the number of more efficient vehicles on the market, including electric cars. Such vehicles can be more expensive than conventional vehicles. If the uptake of more expensive vehicles was stimulated, these policies would marginally **reduce the affordability of buying new cars** for some groups who would otherwise have bought a new car. This might have knock-on effects on the second-hand car market, at least in the short-term, as such cars might also become more expensive as potential purchasers of new cars are put off from buying a brand new car and instead turn to the second-hand car market. For most drivers, it is arguable whether this should be considered to be an SDI, as most of those potential purchasers of new vehicles could as easily buy an alternative vehicle, albeit one that might be smaller or older than the one they would otherwise have bought.
2. As such cars are more fuel efficient, they have the potential to **increase the affordability of car use** for all of those using them, i.e. to reduce running costs, as less fuel would be used to travel the same distance, everything else being equal. Hence, this potential rebound effect would reduce the benefits from such policy instruments.
3. Similarly, policies aimed at encouraging more fuel efficient driving behaviour, such as *better information on the more efficient use of cars*, would also **increase the affordability of vehicle use**. While, generally, the resulting rebound effects should be recognised and reversed, there is the potential to exploit such effects to benefit low income drivers. Given that it is low income drivers who are likely to struggle more in paying for the costs of driving, it is these drivers, as well as other members of their respective households, who would probably benefit more, relatively speaking, from adopting such policies. As low income households are less likely to have access to the internet, care needs to be given as to how best to target such drivers.
4. Many of the policies aimed at the purchase and use of more efficient vehicles and driving behaviour have the potential to deliver **wider benefits** on users and non-users alike in the

form of improved air quality, reduced noise levels and reduced adverse impacts from climate change. Even though the impact on any individual will be marginal, and perhaps unnoticeable, the net impact across all of those affected could be significant. The scope and scale of such impacts will depend on both location and mode.

Knowledge gaps:

- **The social groups that buy new and second-hand cars.** While generally those on high incomes buy more new cars than those on lower incomes, some people on potentially low incomes do buy new cars. A better understanding of who buys what type of new car and why, and also who buys what type of second-hand car, would assist in identifying the extent of potential SDIs from such policies.
- **The potential knock-on effect of higher new vehicle prices on the second-hand market.** An indirect effect of higher new car prices could, at least in the short-term, be higher prices for second-hand cars. The extent to which this effect might lead to SDIs is not clear. A better understanding of this effect would help to clarify the extent of this potential SDI and also to identify measures that could be put in place to mitigate any resulting SDI.
- **The extent to which vans are used as passenger transport and by whom and for what purposes.** It is likely that in certain households, e.g. those where the principal income provider is self-employed and uses a van for work, that vans will be used as a source of passenger transport. However, it is not clear the extent to which this is the case and therefore whether this is an SDI.
- **The views and understanding of different technologies by different groups.** Given that some new vehicle technologies are distinctly different to those used in conventional vehicles, it is important that the views and potential attitudes towards these technologies are understood in order for the benefits to be communicated well, the concerns to be allayed and any potential barriers overcome. At the moment, there is little information as to how people might deal with the new vehicle technologies.
- **Translating apparent support for measures to encourage the purchase of more fuel efficient vehicles to practice.** There appears to be support for government action to encourage people to purchase more fuel efficient vehicles and a majority of the population claim to take account of a car's CO₂ emissions when purchasing a vehicle. While policies are in place to stimulate the purchase of more fuel efficient vehicles, such as the differential rates of Vehicle Excise Duty and exemptions under the London Congestion Charge, it might be possible to do more to stimulate such behaviour. With this in mind, it is important to note that evidence suggests that factors other than CO₂ emissions are more important to potential buyers. It is important to understand how best to translate this apparent support for more fuel efficient cars to influence more actual purchasing decisions.
- **Taking account of the rebound effect of improved affordability from using more efficient cars or using cars more efficiently.** A rebound effect of all the policies that will make vehicle use more fuel efficient is that they make use more affordable. The most appropriate complementary policies need to be identified to ensure that the climate change and social benefits of the policies are realised and maintained. These might differ by social group.
- **Communicating eco-driving to the groups who would most benefit from it.** Given that low income drivers already spend a relatively large proportion of their expenditure on transport, it is this group which is more likely to experience a higher relative benefit from taking up eco-driving. Consideration could be given to how such drivers could be best targeted taking into account their potential lower access to the internet.

Key implications for policy makers, in addition to the general implications noted above:

- Recognise and assess the potential impact of such policies on **low income groups** in particular. While increased prices of new cars would on average affect those on higher incomes more, there might be short-term, knock-on effects (in terms of higher prices) on the second-hand market, which could impact low income groups. As with policies to reduce the number of trips (see above), the impact on low income drivers might be disproportionate. The use of financial incentives could be targeted at such groups, if this were found to be appropriate.

- **Ensure that CO₂ reductions are delivered**, as many of the policies considered, including those aimed at raising awareness, make use more affordable, and therefore are likely to lead to a rebound effect of increased travel. In this respect, complementary instruments, such as those aimed at reducing trips (see above), might be appropriate to ensure that the CO₂ reductions are maximised.
- **Consider targeting low income groups** with policies, including awareness raising and eco-driving, that reduce the cost of driving, as such an approach has the potential to address SDIs and tackle transport's CO₂ emissions.
- Ensure that policies targeting **vans take into account the needs of the self-employed**, as these vehicles could also be used for the purposes of passenger transport.
- **Explore how best to capitalise on apparent public support** for action to encourage people to buy less environmentally-damaging vehicles.

Transport policies focusing on stimulating the use of alternative fuels

There was little evidence on the SDIs associated with the one policy covered that would reduce transport's CO₂ emissions through the use of **alternative fuels**, i.e. ***promotion and use of sustainable biofuels***. However, it was considered that there would not be any SDIs from the perspective of the transport user, as the policy would not have a significant affect on travel behaviour, at least in the short-term. While a short-term increase in the price of fuels might result, it is not clear whether this would be significant and noticeable in the context of ongoing changes to the price of fuel caused by other factors.

The one potential knowledge gap that might be important in the context of alternative fuels is **the views and understanding of alternative fuels by different groups**. Given that the use of biofuels (and potentially other renewable sources of energy) is likely to increase, it might be useful to understand people's perspectives of and attitudes to such fuels in order that benefits can be communicated and any potential barriers to their use overcome.

No specific implications for policy makers were identified in relation to the ***promotion and use of sustainable biofuels*** that have not been addressed in previous sections. If increased use of biofuels leads to significant increases in the price of transport fuels, the issues for policy makers will be similar to those discussed with respect to using other economic instruments that reduce trips by raising the price of travel (see above). In the longer term, if dedicated biofuels vehicles are produced, the issues for policy makers will be similar to those discussed for more fuel efficient vehicles (see above).



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