



## **Climate Change and Transport: Meeting the Challenge of Ambitious Carbon Reduction Targets**

This paper offers the Commission for Integrated Transport's (CfIT) thoughts on transport's contribution to meeting ambitious climate change targets across the economy. This follows the Government's recent commitment to reduce greenhouse gas emissions to 80% by 2050 as an urgent and feasible task of short and long-term strategy.

In 2008, the Department for Transport (DfT) asked CfIT for advice on what the implications of a world of carbon targets would be for transport strategy over the next 30 years and, among other things, the extent to which this would require a change in the DfT approach to transport strategy development.

At the core of this advice is CfIT's 'Transport and Climate Change Report' (2007), which examined transport's role as part of wider efforts across the economy to deliver the most cost-effective carbon reductions consistent with the Government's aspiration at that time (achieving a 60% reduction in CO<sub>2</sub> emissions by 2050). Readers should refer to this report for the detailed recommendations and substantial evidence base.

As this current advice was requested within a short timeframe, we were not able to update our 2007 study against the 80% greenhouse gas reduction target. Instead, and in line with our remit to offer 'blue-sky thinking' on future strategic issues, we reviewed our earlier analysis and considered what other possible options were available. As such, this paper includes proposals that require further analysis to assess cost-effectiveness, alignment with Government policy, practicality and public acceptability. We emphasise that our advice is at the level of broad principles and approaches, not detailed recommendations.

We also acknowledge that the science and policy surrounding climate change is a fast and ever-evolving field. For example, since completing this advice, the Government has announced a programme of investment in the electric cars concept, and the Committee on Climate Change work programme continues to advance. Equally, we cannot ignore the global context and the impact that a downturn in the world economy may have on energy consumption and the achievement of climate change targets.

Climate change will continue to be highly prominent in the fields of research and policy development. We hope that this paper compliments future thinking on how transport can be tailored to assist in tackling one of the most pressing issues we now face both as a nation and as a people.

**Commission for Integrated Transport  
April 2009**

# **Climate Change and Transport: Meeting the Challenge of Ambitious Carbon Reduction Targets**

## **Advice to the Secretary of State for Transport from the Commission for Integrated Transport**

### **Summary**

1. Following scientific and economic advice, the Government has committed itself to the reduction of greenhouse gas emissions as an urgent and feasible task of short and long term strategy. The Department for Transport (DfT) sees this as a key priority for the transport sector, and emphasises the principle that this will require changes in travel patterns and choices by individuals and companies as well as advances in technology.
  
2. The Commission for Integrated Transport (CfIT) was asked by DfT to consider what the implications of a world of carbon targets would be for the way DfT develops its transport strategy over the next 30 years. This think-piece provides CfIT's initial thoughts, reflecting, amongst other issues, the following:
  - To what extent might this require a change in the DfT approach to transport strategy development?
  - What are the implications of hard carbon targets to the strategy outlined within DfT's 'Delivering a Sustainable Transport System' strategy.
  - How might this change the way the Government relates to local and regional government?
  - Where might DfT need to join up with other Government Departments?
  - What are the implications for the way DfT appraises schemes?
  - What are the implications for the way transport is funded (e.g. revenue/capital split)?

3. We endorse the importance and feasibility of transport making a full and substantial contribution towards emissions reduction as part of a cost-effective, economy-wide approach. This will require Government, companies and citizens all rethinking the way we travel, the vehicles we buy, what modes we use, the destinations we go to, the frequency of trips, and the alternative ways of participating in economic and social life which involve less movement. Done carefully, these changes will improve the quality of life, not harm it.
  
4. Our views on the strategy and policy developments required are summarised below, with further detail on each point provided within the body of this paper.

#### Strategy Development

- *Better joined up Government* such that the transport implications of a much wider range of initiatives are automatically assessed from the point of view of their carbon effects, including initiatives in relation to post offices, hospitals, schools, office location, consumer choice, commercial interest, speed limits, the setting of constraints and objectives which determine the relative prices of competing parts of the transport sector, employment and industrial development in different regions, trade and funding arrangements.
- *Decisive, insistent and very clear national framework of powers and directions* within which local and regional authorities have power, incentives and funding for contributing to carbon-reducing strategies, and no incentive to opt out from them. This should include flexibility as between capital and revenue funding within any given total budget.

#### Policy Development

- *Much more rapid implementation* of economically-efficient strategies for reducing traffic levels in towns, including smarter choices, prices, allocation of road space, public transport quality and regulation working in harmony – but with a much greater attention also given to the often

ignored aspects of suburban, inter-urban and rural conditions, the role of freight and service traffic.

- *Inclusion of carbon effects in appraisal rules* to be implemented by all statutory agencies, and with a consistent approach to the relation between unrestricted demand growth, demand management and capacity provision covering national and international movements, not only local ones.
- *Coherent policy packages* within which each element pulls in the same direction, to replace both narrow project-by-project appraisal and also 'packages' of inconsistent elements.

### **The New Context: The Committee on Climate Change's 'Building a Low Carbon Economy' and DfT's 'Delivering a Sustainable Transport System'**

5. In October 2008, the Government committed to at least 80% reduction in greenhouse gas emissions by 2050, relative to 1990, and is now considering the legally binding targets for the period from 2008-2022.
6. On 1<sup>st</sup> December, the Committee on Climate Change (CCC) recommended that the first stage of these targets should be a unilateral commitment of at least 34% by 2020, with the intention of increasing this commitment to at least 42% as part of an international agreement.
7. The Committee suggests that there is substantial potential for the transport sector to reduce its emissions during this early period, including by technical improvement of vehicles especially private cars and vans, changes in driving practices notably keeping to, or reducing, speed limits, a range of changes in travel choice brought about by demand management, and action to prevent 'rebound' of improved engine efficiency into greater traffic levels. The feasible reduction suggested for domestic transport is in the range 23 to 32 MtCO<sub>2</sub> by 2020, compared with 150 MtCO<sub>2</sub> in 2005, but with an additional potential from greater demand changes (both within the period to 2020

and beyond) to be included in their work programme for the coming year.

8. This would imply roundly a 20% reduction to be achieved in about 12 years, or roundly 2% reduction each year, or perhaps more, from now to 2020. (The implied pace of change thereafter is faster).
9. International aviation and shipping are not included as specific budgets, but their emissions should be included in the global total. Since they are large and growing rapidly, even after allowing for technical improvement, the CCC recommends that 'it is therefore essential either to curtail emissions growth substantially or to set more stringent targets for all other sectors'.
10. CCC asserted that 'it concurs with the Eddington Study judgement that unconstrained growth of capacity is not desirable and that road pricing is likely to have a significant role to play both in city centre environments (congestion charges) and on motorways'.
11. In November, shortly before receiving the CCC report, the DfT published 'Delivering a Sustainable Transport System', the follow-up to 'Towards a Sustainable Transport System', including a commitment to reducing transport's emissions of carbon dioxide and other greenhouse gases as one of the five broad goals of Government policy. It proposes the iterative development, by stages, of a flexible strategy aimed to ensure that 'the aggregate level of emissions declines over time in a manner consistent with our greenhouse gas targets'. At that time (before publication of the CCC targets), it asserted that 'Our priorities for major programmes to 2014 have already been identified, and next year we will be starting to generate options for specific investment packages for the 2014-19 period'.
12. While these important reports were under preparation, the Department for Transport asked CfIT for swift initial advice on *what should be done*

*if the CCC recommendations require the delivery of 'hard' carbon targets by the transport sector.* This note is the initial response of CfIT to this question. Our advice has been based on discussions, a workshop attended by Commissioners, a Plenary session, and a series of drafts, but we stress that there is still much work to do and all the points made here will need to be subject to deeper and more detailed consideration in coming months. In that work, we propose clearly distinguishing between the decisions that will require:

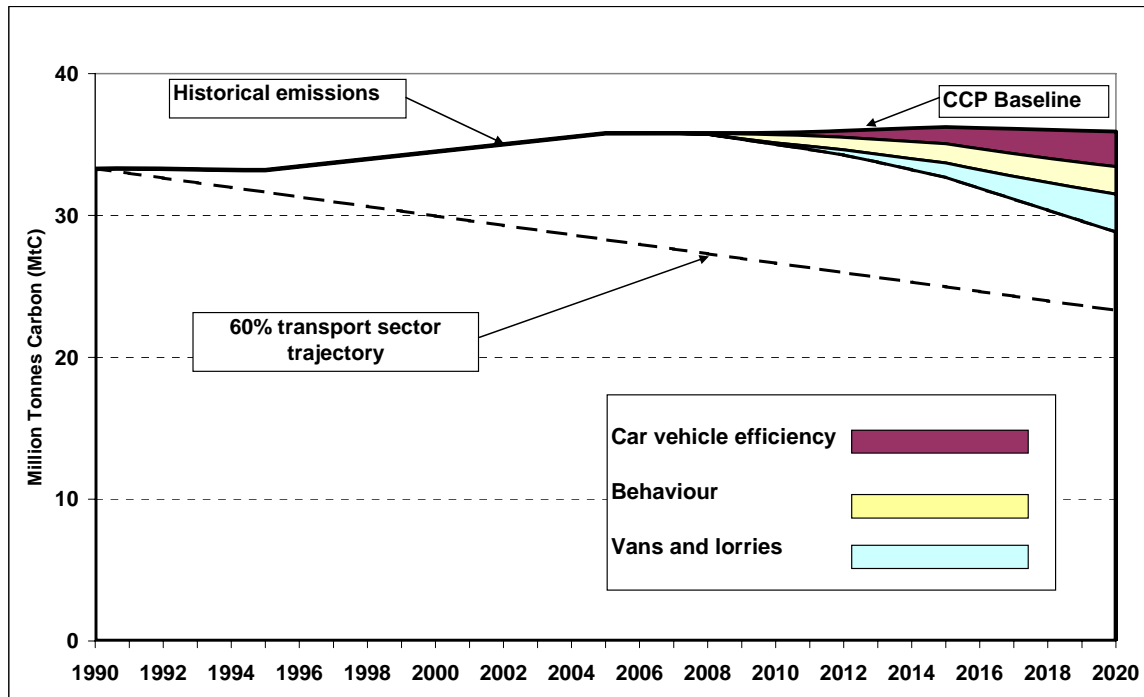
- Government action
- Market action
- Action by individuals

13. And these will need to take account of the interactions between them, and the specific actors whose decisions will be necessary. However, at this stage *we emphasise that our advice is at the level of broad principles and approaches, not detailed recommendations.*

### **Earlier Policy Assessment**

14. In 2007, CfIT carried out its own study of the scope for carbon reductions in transport. At that time, we looked at transport's contribution in the context of an economy-wide goal of a 60% reduction below 1990. Our conclusion was that while official modelling saw greater emphasis on emission reductions in other sectors than transport (on the argument that this would be the most cost-effective approach), we had reservations about the robustness of this view, and we thought that transport could and should do more in the shorter term as part of a cost-effective response to cutting emissions. The combined results of additional measures which CfIT felt should be adopted may be seen in Figure 1, from our report (refer Annex 1 for a summary of the CfIT recommendations).

Figure 1: Emissions savings to 2020 over the CCP baseline from additional measures proposed by CfIT



Source: 'Transport and Climate Change – Advice to Government from the Commission for Integrated Transport' – September 2007

15. Thus the view was that:

- Carbon emissions from transport have risen from 1990, with some levelling off from around 2004-6;
- There is scope for turning this upward trend down, as a result of the combined effect of policies aimed at increasing car vehicle efficiency, behaviour change, and improvements to vans and lorries;
- The resulting decline would represent a significant improvement on government policy at that time (delivering by 2020 a 14% cut in domestic transport emissions against 1990 levels), but short of a notional trajectory to achieve a 60% reduction for the transport sector by 2050.

16. Our proposals were not intended to be definitive, but an indication of what might be possible and by when. Our proposals indicated that, with

regard to reducing surface transport emissions, more could be done cost-effectively in the short term and more needs to be done to prepare for the long term.

### Comparison between CCC & CfIT Transport and Climate Change Report

17. The carbon savings that are assumed in the CCC report and how they compare with our own projected savings are summarised in abridged form in the table below, and in full in Annex 2.

Table 1: Impact of additional measures proposed by CfIT and the CCC

Measures	Carbon Savings 2020 (MtCO <sub>2</sub> )	Carbon Saving 2020 (MtCO <sub>2</sub> )	Carbon Saving 2020 (MtCO <sub>2</sub> )	Carbon Saving 2020 (MtCO <sub>2</sub> )
	CfIT	CCC – Current Ambition	CCC – Extended Ambition	CCC – Stretch Ambition
<b>Cars</b>				
Vehicle efficiency Improvements	8.8	4.3	11.6	
Measures to support changes in driver Behaviour	6.2		3.2	6.2
Cars total	15	4.3	14.8	6.2
<b>Public transport</b>				
Improved efficiency in bus & rail operations	1.1		0.6	
Public transport total	1.1		0.6	
<b>Lorries &amp; vans</b>				
Vehicle efficiency & operation of large goods vehicles	6.2	0.3	1.8	1
Vehicle efficiency & operation of vans	3.7	0.4	1.2	2.7
Lorry & van total	9.9	0.7	3	3.7
<b>Fuels</b>				
Bio-fuels			5	
<b>Overall savings</b>	<b>26</b>	<b>5</b>	<b>23.3</b>	<b>31.7</b>

18. Of particular note to CfIT, Table 7.5 in the CCC report (abatement opportunities for transport) suggests it places greater weight than we did on 'supply side' gains from car efficiency and bio-fuels, which deliver roughly 70% of the total saving by 2020 in the CCC extended

ambition scenario, compared to about a third by 2020 in our own report. By contrast, the CCC extended ambition scenario assumes significantly lower savings from changes to travel behaviour, and from lorry and van efficiency and operation than the CfIT report. However, CCC have stated that they expect further feasible travel behaviour changes to be identified in their 2009 work programme.

19. Thus, while we broadly agree about the magnitude of carbon saving that is achievable by 2020 (comparing our projected savings with the CCC extended ambition scenario), our assumptions about the savings achievable from supply and demand side measures differ. This suggests that there may be significant 'upside' (i.e. savings over and above those identified individually either by CfIT or by the CCC).

20. We caution against an approach which relies excessively on any subset of policy measures (e.g. an approach which focuses primarily on vehicle efficiency and fuels, and relatively speaking, neglects behaviour change – or vice versa). This is because:

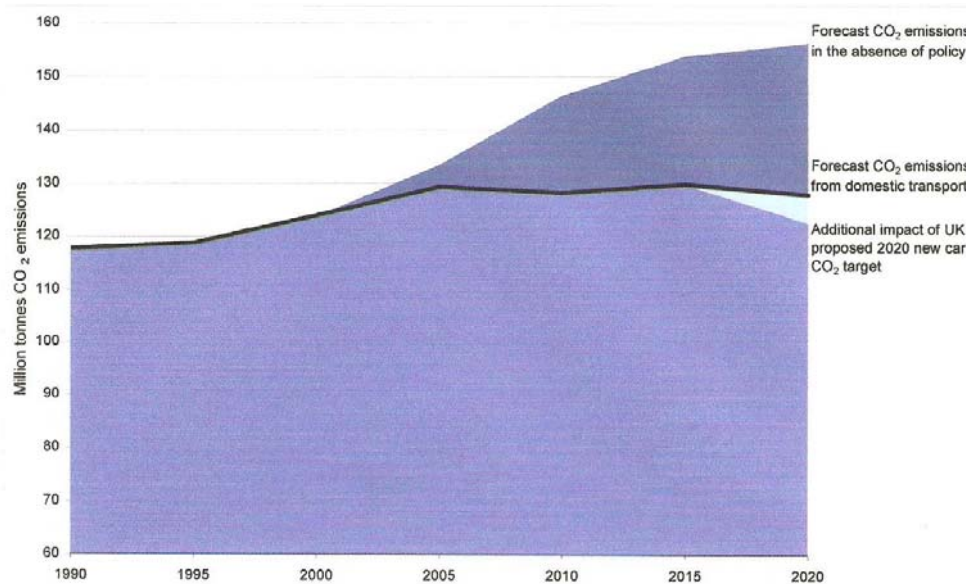
- The reductions in emissions that are required are extremely challenging.
- It is unlikely that the theoretical potential for carbon savings from efficiency measures, for example, will be fully met, both because of the risk of what the CCC terms 'rebound' and because of imperfections in the policy-making process.

21. Our instinct is therefore that more intensive use of policy levers such as road user charging, smarter choices, pricing, speed enforcement/limits and land-use planning is likely to be a necessary part of any effective package to reduce emissions to within the 'budget' proposed for transport by the CCC. We consider it highly unlikely that the carbon budget for transport will be achieved between now and 2020 if these policy levers are not applied more vigorously than at present. We

welcome the CCC's intention to examine in greater detail the potential of these 'demand side' measures during 2009.

22. DfT's own more recent analysis shows an expectation of growth in carbon emissions without policy intervention potentially continuing up to 2020 (and beyond), the combined effect of existing policies serving only to flatten off the increase, and a small extra reduction due to the proposed manufacturers' target on new car efficiency (shown in Fig 2, from DfT's 'Towards a Sustainable Transport System – an update on progress', July 2008).

Figure 2: Historic and DfT forecast CO<sub>2</sub> emissions from UK domestic transport



Source: Historic data (apart from rail emissions) from the National Atmospheric Emissions Inventory 2006, rail data from DfT analysis (passenger trains only); forecasts from DfT analysis

23. Although a gap from the trajectory consistent with the 2050 figure is not shown on this figure, it can be seen that the implied gap remains, and at face value appears to be bigger than the gap in the CfIT figure (note: neither of these analyses included the UK share of emissions from international air or shipping).

24. In one sense there are many different trajectories which could be consistent with meeting an 80% reduction by 2050, including even some trajectories which allowed an increase in the earlier part of that

period, followed by steeper decline later. But we note that the underlying objective is to reduce the total number of tonnes of carbon in the atmosphere. Since carbon dioxide lasts for many years, a failure to make reductions in the early period has a disproportionately unfavourable impact on the total emissions over the whole period, and therefore there is a strong advantage in early reductions.

25. The starting point must be to establish how the UK economy as a whole, and as part of global action on climate change, can accelerate emissions reduction in the short to medium term in the most cost-effective way. The goal for cutting transport emissions in turn should be set in the context of what might be possible through action to cut emissions in other sectors of the economy.

26. Our expertise does not extend to considering cost-effective non-transport options for cutting emissions. However, the urgency and scale of emissions reduction needed to avoid the worst consequences of climate change (as suggested by the consensus of international scientific opinion) leads us to two conclusions.

27. First, the analysis of what needs to be done in transport over the CCC budgetary periods to 2022 must urgently be converted into action on the ground. The CCC's analysis of the overall emission reductions possible is not markedly different from that carried out by CfIT in its 2007 report, yet very little progress has been made in taking forward proposals to contribute actual reductions now.

28. For instance, the CCC "Extended Ambition" scenario, which offers more radical technology options, together with increased bio-fuels and demand side measures, actually includes measures we noted in 2007 as being cost-effective measures for reducing surface transport emissions (e.g. speed limit enforcement, eco-driving and smarter choices).

29. Second, with the new targets and notwithstanding the recent work done by the CCC, it is reasonable to review whether substantially larger and quicker reductions in carbon emissions from transport are possible as part of a cost-effective, economy-wide approach, than was envisaged in our own earlier work, or in that of DfT. A particular priority is the need to clarify whether the implied trajectory in *Delivering a Sustainable Transport System* is consistent with that for the transport sector in *Building a low-carbon economy*: if it is not, then that needs to be addressed now rather than in 2014.

30. We have cited three important pieces of work underpinning this assessment, our own, that of the DfT, and the first report from the CCC. We are however aware of a number of other studies, not yet officially supported, which have considered the potential for policy initiatives with greater effects than those described above, and in some cases argued that these can be made both politically acceptable and affordable, as well as delivering other benefits. Until now some of these studies have been considered of fringe importance, but we now propose that there should be a serious and urgent re-examination, since they may offer important new thinking about what should be done. Included at Annex 3 is a list of the material we believe would aid DfT's thinking.

### **The Core Transport Contribution: The Private Car**

31. Technical improvement in engine efficiency is vital, but it cannot meet the targets alone, not least because the fuel saving from more efficient vehicles will of itself lead to an offsetting increase in travel. It needs to be said quite simply that transport will not effectively contribute to carbon reduction unless the growth trends in private car use and air travel are changed: this was our unanimous view. The strong view in our discussions (though not unanimous) was also that this will mean not only slowing, but also reversing the trends.

32. Nor can we think of transport in isolation when contemplating such radical carbon reductions as 80%. To give an example of this, zero emission cars using hydrogen or electricity, only, make sense if we are confident we can make the hydrogen or electricity without generating carbon emissions elsewhere. So an electric car, for example, is only a low-carbon vehicle if we have successfully decarbonised the energy sector. There are a whole host of similar inter-dependencies which come into play when thinking about this question.
33. In considering car and air use we note that the two are not exactly comparable. While both are marked by strong pressures for growth in demand, and constraints on the possibilities of meeting that growth by proportionate increases in supply, there are differences in the economic drivers, public attitudes, political acceptability, and maturity of consideration of alternatives. The evidence on all these questions will need to be scrutinised carefully. Yet the bottom line will be that growth, or small reductions, in either or both of these can only be sustained if there would be substantially greater reductions elsewhere, as discussed further below.
34. Therefore, we expect to see more sophisticated pricing levers used (e.g. reducing the price of travel where it is powered by low carbon measures and increasing the price of travel where it has a high carbon footprint). This might also include the use of other levers to influence choices, including incentives and regulation affecting travel. To be acceptable, actions which increase the cost of travel must be accompanied by positive incentives, including improvement in the alternatives on offer, especially in terms of quality and reliability of low carbon methods of travel, and attractiveness of low carbon patterns of activities involving less travel or shorter distances.
35. At this stage we also want to emphasise a long term weakness in discussion about transport, that nearly all the emphasis has been on passenger transport, with far too little on goods and service transport.

While we make some comments below, there is still an urgent need to consider this sector in much more detail.

36. We would be looking for a wider view of 'behavioural change' than just some percentage shift in the proportions using each mode. It will also affect the balance between long and short journeys, peak and off peak journeys, most likely the speed of travel, land use planning, and the design and construction of the built environment. All these changes need incentives to make them happen, and sanctions or disincentives to prevent them from being ignored or over-ruled.
  
37. For this reason, change needs to be managed with great sensitivity to the different conditions and alternatives in rural areas, towns of different sizes, and social groups or individuals with different special needs and constraints. Managing change needs also always to be done with explicit consideration of the time scale of adaptation which is reasonable, adjusted to the pace at which life changes for other reasons. A great proportion of the initiatives that will be necessary are already within the scope of local or regional authorities, and they will need to be given very clear guidance on the powers, funding, degree of discretion and policy framework for implementation of local policies. However, it is essential that the 'national' networks passing through every region will be planned as part of a single coherent overall network, which is how travellers see them, and with compatible assumptions on demand management and traffic impacts.
  
38. In turn it follows that National and Local Government will need to give much more emphasis to the design and implementation of coherent packages of policies, projects and incentives, rather than the separate consideration of individual projects. Packages will need to rely on the synergy of a variety of measures all pulling in the same direction.
  
39. This is not only a matter for the public sector. Private employers also will be drawn more and more into travel planning for their employees,

and consideration of their own business travel, as well as fleet management.

40. Although this advice is aimed at DfT, it is clear that emissions from transport are also influenced by decisions made by other Departments, for example when decisions about location of post offices, hospitals, schools, or national facilities change the distance people need to travel or the methods of transport they use. For that reason it is essential that a broad definition is given to transport which includes these other Departments.
41. One unresolved issue of great importance in the CCC report is that car use is included in the formal targets, whereas international aviation is not: they explain that this is due to the technical issue of definition of allocation (which they expect to be solved by international agreement) not due to any assertion that aviation necessarily has a different type of importance. However, the wider policy discussions do include some views that aviation should be designated as a sector where increases in greenhouse gas emissions should be accepted: CCC argues that if that view is taken (which they themselves neither endorse nor challenge) some other sector will have to reduce emissions by a greater amount to compensate.
42. We have not seen a case made that international aviation is inherently so much more important to the UK economy than the equivalent movements within the UK (i.e. comparing tourism with tourism, business with business, freight with freight) to justify giving it a special status in transport appraisal and allocation of resources. Therefore we recommend reviewing the assumptions of air travel demand and capacity growth so that consistent criteria are applied.

## Taking the Challenge Seriously

43. The reasons, objectives and methods need to be spelled out with honesty and precision. Although there have been many speeches, conferences, policy statements and discussions about carbon reduction in transport, we are concerned that there has not yet emerged a clear, coherent, consistent perception in the public, or among transport professionals, about what this means in practice. We advise that demonstrating clarity is essential in order to deliver results. This will require a consistency which has not been common in transport, in particular:

- Explaining what the new targets mean for individual citizens, as well as for transport providers, local authorities and other transport agencies.
- Accepting that price signals have a role to play in motoring, freight transport, public passenger transport and aviation: if the relative price of car and public transport use, for example, is to encourage more car use and greater carbon emissions, the change that non-price methods then have to deliver is made very much more difficult. Travellers compare the cost of car use, bus use, train use, parking etc at face value, without making allowances for complex caveats due to their different funding arrangements. It is the job of Government to ensure that the prices give incentives which help achievement of carbon targets, rather than hinder them.
- Insisting that the net carbon effects of every transport proposal are calculated and included in the first rank of headline results.
- This should include not only flagship projects, but also small local initiatives, changes to regulation or control, and the effects of decisions made by other Government Departments (for example on post offices, location of hospitals, school catchment areas, etc).
- Where carbon-increasing measures are thought desirable from the point of view of other social or economic objectives, the evidence

for these other benefits should be subject to greater scrutiny and challenge, with a higher level of proof required in order to test for Optimism Bias by project promoters..

- We need to give more attention to policies aimed at reducing the need to travel, including all the instruments of 'smarter choices' including working practices in both private and public sectors. The programme of incentives and encouragement needs to be built up. (At the same time we emphasise the much-repeated, but rarely implemented, understanding that the benefits of such measures need to be 'locked in' by supporting policies to prevent induced traffic from the resulting reduction in congestion).
- We note that the CCC asserted that 'it concurs with the Eddington Study judgement that unconstrained growth of capacity is not desirable and that road pricing is likely to have a significant role to play both in city centre environments (congestion charges) and on motorways'. It is essential to move more swiftly to clarity about whether this is, or is not, a key element of the Government's transport strategy, since it affects the intensity and impacts of all other measures and policies required.

44. The more exceptions, divided goals, delayed decisions or apparent inconsistencies are seen by the public, the more difficult we feel it will be to generate the required commitment at a local level. Conversely, rapid implementation of some successful 'quick wins' that are big enough to be important will give greater confidence in what is achievable.

45. We judge that education and publicity can help enormously in deepening public understanding of the measures needed, and helping people to plan their lives in accordance with them. However, exhortation in the absence of consistent policy will have the danger of making people cynical and unsupportive.

## Special Features in the Current National and International Context

46. We are of course aware that there are urgent problems facing all Governments at the present time because of the crisis in financial systems. The carbon agenda must find a way to be robust in running across several economic and electoral cycles.

47. Some Governments are using this as an argument to say that 'now is not the time' to engage in initiatives on carbon reduction. That judgment itself is beyond our remit, but we do consider that there are many initiatives that can be made in the transport sector that need not be affected by this argument, and all decisions need not to be considered without distractions or jumping to misleading short term conclusions:

- If funding needs to be cut or taxation increased, this can be done in a way which improves the carbon balance (for example by greater reliance on carbon-reducing sources of revenue in preference over carbon increasing, notably fuel intensive, activities);
- If there is funding available for employment-generating investment, schemes that reduce carbon can be chosen in favour of those which generate more traffic.
- If there are pressures to change the balance of different financing methods (private, public, PFI, etc), then incentives schemes need to be built in that reduce traffic rather than increase it.
- If there is a search for new areas of Government activity where privatisation could assist public funding, this should be considered in such a way as to build in incentives for pricing which reflects environmental impacts.
- The CCC will be advising the Government on five year carbon budgets. We propose that the Government will need to show how its own decisions (both financial and policy) are supporting those targets.

48. We are aware that such discussions always create the danger that old and rejected 'favourite projects' can be taken from the bottom drawer and dressed up to meet the current preoccupations. Transport capital projects can be brought forward on Keynesian grounds and yet the ones chosen might substantially increase the demand for travel through market expansion or induced traffic, or be carbon intensive in construction and operation. Government needs to be alert in combating this.
49. At the same time, some old or abandoned initiatives may now have something to offer in the new context. We believe there are some potentially useful lessons to be learnt from the fuel price escalator, including its 'branding' and arguments used for its justification, especially since it seems likely that an era of high oil price may be inevitable whether from the point of view of the market or of achieving transport targets, as well as fiscal needs.
50. There has recently been interest in the idea of tradable personal carbon allowances, in which everybody would be awarded a 'ration' of carbon they could use, and be free to use this in the way they want (whether for transport or other purposes, and for whatever mode of transport they want, but also be allowed to sell their ration to other people at a market price). The total volume of carbon used would be capped at the national target, but people's own choices would determine what they used. Transport is a sector for which such a system might provide great advantages, taking the 'sting' out of trying to influence many different people's choices.
51. We note that tradable personal carbon allowances have the attraction that they would provide greater certainty of achievement of a carbon target than other policy combinations, and that they would act as a strong stimulus to the market to develop zero-emission vehicles. On the other hand, we know little of the psychological, social and economic dynamics that would determine how tradable personal carbon

allowances would work in practice, and we do not consider that we are yet ready either to endorse or dismiss the idea.

52. In any event, it is important that the Government should be clear about the balance between direct Government intervention, and the use of market mechanisms, in securing the required reductions.

### **Re-thinking Infrastructure Needs**

53. We consider that with an active, non-marginal intervention to change the expected future trajectories of demand, infrastructure supply 'to meet demand' will need to be rethought from scratch. Thinking in this area has proceeded a long way in roads planning in recent years (not always implemented in practice) but it needs to be extended to air transport and indeed also to rail transport. It is not axiomatic that new high speed rail lines will always contribute to carbon reductions, especially if they have the effect of increasing average journey distances and trip frequencies. In general, planning for infrastructure and other investment needs to start from a presumption that the 80% carbon reduction target will have been met by 2050, and hence be consistent with the patterns of travel that meeting this target will have produced.

### **Some Issues of Appraisal Methods & Rules**

54. Stating that climate change is an important formal goal of transport interventions is important, but it is not sufficient on its own. We make the following suggestions for the development of appraisal standards:

- The objective to reduce carbon emissions should be extended to include all greenhouse gases.
- The current formal modelling and appraisal rules do not easily handle a number of critically important issues, especially synergy in

packages of policies, the trajectory of build up of effects over time, smarter choices, and relationship between changing attitudes and their effects on behaviour. However, their omission does not mean they can be ignored, and when the appraisal rules or evidence base does not support formal modelling it is still necessary to include consideration of their importance in an explicit and high profile way.

- Changing funding arrangements can also change the estimated effectiveness of policies. This especially includes the interchangeability of revenue and capital spending, which will need to be made easier in order to give full acknowledgment to the role of improvements in operations, smarter choices, information systems etc. It is often the case that revenue spending can achieve faster and more worthwhile effects than infrastructure change, but this is not reflected in appraisal or funding allocation.
- It should not automatically be assumed that extension of the geographical size of catchment areas for labour and markets is the way to develop economic benefits. Favouring higher densities can be an alternative route.
- Work on the National Networks Committee needs to build the 80% target into their thinking, including consideration of what follows for network needs after the trend of traffic growth is reversed. There should be no presumption of continual growth in traffic (hence congestion), and where 60 year appraisals are carried out there should be no presumption of stability after the latest forecast year.
- It is not obvious that the currently assumed 'value' for carbon is consistent with a price that would produce the required reduction starting from now. All transport actors need clear signals about the price of carbon they should assume in influencing their own transport decisions and investments.
- It may be that the discount rate used is much too low for carbon when there is a clearly greater benefit from early reduction, even apart from the usual reasons for discounting the future. This argument would lead to adopting a very much higher value for

carbon in the near future, but discounting it more heavily as (and if) the targets are achieved.

- New modelling assumptions will need to be developed about what future levels of traffic over the long term are consistent with our carbon-reduction aims for the transport sector. These assumptions should be factored into cost-benefit analyses and the scheme appraisal process. For example, we would expect that the calculation of cumulative economic benefit of a scheme over the next 60 years, as measured by large numbers of small time savings, might look significantly different if traffic growth assumptions were substantially different to those at present.
- Interaction between land-use and transport should be considered both in terms of changing patterns of travel which can be achieved within existing land uses, and in terms of the implications for travel of all new development. In the latter case, all new development approval should insist that the resulting carbon use should be better than the existing average, at least.

### **Sharing Responsibility for Achievement of the Target**

55. It would be desirable to disaggregate any national carbon reduction budget target for transport, in order to provide clarity as to the task faced by each of the agencies whose actions and policies influence carbon emissions. The disaggregation should take account of geographical level (i.e. targets for local and regional authorities), type of transport service (i.e. passenger and freight; different modes) and also specifically include private sector companies, and each relevant other government department (health, education, etc) as well as the DfT.

56. In order to do this, it will be necessary to understand what proportion of the necessary reduction in emissions can confidently be predicted to be met through vehicle technology and alternative fuels, and therefore

what proportion will have to be met through changes to travel behaviour. On this point, we would urge caution in too readily assuming that the bulk of the reduction in emissions can be delivered through vehicle efficiency savings.

57. This might lead to disaggregated guide figures for the reduction in travel that is necessary on the motorway and trunk road network, on local roads, and at airports. For example, the carbon budget figures for transport could be set out as annual figures, so that progress may be closely monitored. Procedures for monitoring, reporting the results of that monitoring, and devising action to meet any shortfall, should be explicit.

## **Freight**

58. We are concerned that the whole discussion gives too little weight to the movement of goods as compared with individuals, given that nearly half of all transport expenditure is spent on freight movements. In addition, vans are an extremely rapidly growing sector of traffic, and often ignored entirely.

59. There is a substantial research agenda in these points, since we do not yet know as much as we can about travel choices in general or the specifics of factual evidence on aspects from internet shopping to commercial van travel. But we do know *more* about how to reduce carbon intensive travel than we are currently using, and CfIT is keen to work with Government to put this into practice.

## **Further Action for CfIT**

60. The CCC's recommendations give added urgency and force to delivering these reductions as quickly as possible. It is also possible we may need to go further. CfIT is considering commissioning and

publishing further research and recommendations over the next 1-2 years to build on our earlier work.

61. We will be discussing the forthcoming work programme at the CfIT Plenary meeting in January. Actions which will be considered include:

- Seeking direct discussions with the CCC on their own work and conclusions on transport.
- Co-operating with DfT to facilitate its work, and our own activities, including continuation of the current sub-group of interested Commissioners who have built up some momentum.
- Considering whether to initiate a new study, extending our previous work on Transport and Climate Change (further topics are outlined in Annex 4).

## **Conclusion**

62. The latest recommendations of the CCC represent a further and substantial stretching of previous targets, and this has important consequences for the transport sector. Overall, it is our view that asking a greater contribution of carbon reduction from the transport sector will require a substantial rethinking of methods, priorities, policies and pace of change.

63. In reducing emissions from transport, we will be assisted by the fact that there are many carbon-reducing initiatives which are entirely sensible even without considering carbon, because of the benefits they bring in health, safety congestion, and quality of life. These have typically not been developed nearly as far or as fast as is possible. Thus the result is not all 'doom and gloom'. In these cases it may well be that the increasing importance of the climate change objectives will give a boost to policies that we should be implementing anyway for other reasons. For this reason, we do not consider that the ambitious

targets are, in principle, infeasible or painful. But they will require a new level of commitment and clarity.

64. We think DfT will need to distinguish between the measures which can be taken in the 15-year period for which the CCC has set carbon budgets and the longer-term 80% challenge. It is difficult to see how the latter will be delivered across the economy as a whole without some new and radical technologies and a totally different approach to carbon emissions across all sectors.

65. For example, we suggest urgent early research on how tradable personal carbon allowances would work out from a behavioural, psychological and social point of view, and on practical means of implementation. Such research should be profound and wide ranging, but should start very rapidly, be carried out with due urgency, and not be used as an excuse for long delays.

66. Moreover, we suggest that the Government needs a twin-track approach:

- realising as quickly as possible the benefits we can see from rapid implementation of existing technology, and cost-effective behavioural change;
- developing and contributing to a programme of research with strong international co-operation which will deliver the longer-term challenge.

67. The Department will need to be very decisive, insistent and clear on the national framework of powers and directions within which local and regional authorities have power, incentives and funding for contributing to carbon-reducing strategies. This will require cross-departmental support and agreement, and a long-term horizon.

68. On reducing emissions within the transport sector, we support the Government's efforts in tackling CO2 emissions, and believe there is a real opportunity for the UK to show leadership on carbon technologies and carbon markets.

69. However, the transport element of the UK Climate Change Programme, as with the "Current Ambition" scenario outlined within the CCC report, appears to depend heavily on relatively expensive, technology-based measures to deliver emissions savings by 2020 – and there is additional opportunity to capture greater savings cost-effectively through measures to encourage behaviour change.

## REFERENCES:

- Commission for Integrated Transport – *‘Transport and Climate Change (advice to Government)’*. [September 2007]
- Committee on Climate Change – *‘Building a low-carbon economy – the UK’s contribution to tackling climate change’*. [December 2008]
- Department for the Environment, Food and Rural Affairs – *‘Climate Change – the UK programme’*. [2006]
- Department for Transport – *‘Delivering a Sustainable Transport System’*. [November 2008]
- Department for Transport – *‘Towards a Sustainable Transport System – an update on progress (summary of goal narratives)’*. [July 2008]
- Department for Transport – *‘Towards a Sustainable Transport System – Supporting Economic Growth in a Low Carbon World’*. [October 2007]
- Department of Trade and Industry – *Updated Energy and Carbon Emissions Projections*. [May 2007]
- Sir Rod Eddington – *‘Eddington Transport Study: The case for action’*. [December 2006]

## ANNEX 1:

### **CfIT Transport and Climate Change Report (2007)**

#### Climate Change

1. CfIT's remit was "to establish transport's role as part of wider efforts across the economy to deliver the most cost-effective carbon reductions consistent with the Government's 2050 aspiration".
2. This involved complex analysis of the costs and benefits of potential transport measures and the costs of measures available in other sectors of the economy.
3. The Stern Review described climate change as the greatest and widest-ranging market failure ever seen. In identifying what needed to be done to correct this failure, the Stern Review highlighted how:
  - the potential for significant short-term (2020) cost-effective abatement in the transport sector was limited but in the long-term it is much higher.
  - cost effective reductions in the short term will come from improvements to oil-based transport vehicles, biofuels and behaviour change. The clear implication is that failure to move on all three fronts could significantly increase the cost of mitigation later on.
4. CfIT's analysis concludes that:
  - Transport element of Climate Change Programme (CCP) reliant on expensive technology-based (71%) carbon abatement opportunities
  - There are questions over ability of these major elements to deliver the envisaged reductions (e.g. Voluntary Agreement, Renewable Transport Fuel Obligation)
  - Behaviour change is cost-effective, but difficult to implement. Currently only representing 9% of CCP (Smarter Choices).
  - The role of international transport is unclear (e.g. aviation and shipping)
  - On aviation, CfIT public attitudes survey indicates willingness to pay more to travel (re-invested in mitigation measures) or changing travel behaviour to reduce carbon footprint.
5. Our recommendations:
  - build on the climate change programme in a cost effective way
  - focus on tackling either the largest or fastest growing areas of transport emissions (e.g. cars, vans and lorries + aviation)
  - Put strong emphasis on behaviour change as a way of locking in benefits from technological developments (NB rebound effect)

- The combined effect of proposals would increase CCP savings by 71% by 2020 (made up of 26% vehicle efficiency, 24% behavioural, and 25% HGVs and vans)
- Encourage a Cross-Whitehall and Cross-departmental approach necessary to achieve savings

We recommend five packages of reinforcing measures from across the transport industry on **vehicle technology, driver behaviour, travel choices, freight, and aviation.**

We believe these could be introduced cost-effectively in the short- to medium-term and could save 7.1 MtC p.a. by 2020 beyond current plans. The packages are:

**Recommendation 1: adopt a mandatory new vehicle target – complemented by supporting measures (2.4 MtC p.a. by 2020)**

- **100g CO<sub>2</sub>/km mandatory EU target for new car sales to reduce CO<sub>2</sub> emissions by 40% by 2020.** This supply side “push” should be combined with a demand side “pull” - measures to stimulate demand for lower-emission vehicles such as:
  - A greater VED differential between vehicle bands
  - Enhancing the company car tax regime - The company car tax is charged based on a car's taxable value and CO<sub>2</sub> rating. The CCT is good example of a successful fiscal measure which has led to the purchase of more efficient company cars. We are recommending changes to CCT to strengthen the incentive to purchase low carbon vehicles.
  - Encouraging better use and promotion of vehicle labelling in car showrooms
  - Standard issue of gear shift indicators and in-car tyre pressure monitoring systems
  - Improvements to the vehicle test cycle - The company car tax is charged based on a car's taxable value and CO<sub>2</sub> rating. The CCT is good example of a successful fiscal measure which has led to the purchase of more efficient company cars. We are recommending changes to CCT to strengthen the incentive to purchase low carbon vehicles.

**Recommendation 2: Reinforce driver behaviour (0.7 MtC p.a. by 2020)**

- **Reinforcing positive driver behaviour** through a combination of measures to **sustain fuel prices, encourage eco-driving** techniques and promote **greater adherence to speed limits.**
  - Fuel price stabiliser
  - Promotion of smarter driving techniques
  - 70 mph speed limit adherence

**Recommendation 3: Intensive application of smarter choices (1.3 MtC p.a. by 2020 )**

- More intensive promotion of **smarter choices** – promotion of **workplace and school travel planning, car clubs, car-sharing and personalised travel planning** - to encourage take-up of **public transport, walking and cycling**, supported by improvements to the carbon performance of public transport.
  - Workplace/school travel plans
  - car clubs, car sharing
  - information & marketing
  - Teleworking / teleconferencing
  - public transport (rail and bus)

**Recommendation 4: Sustainable distribution – securing savings from the freight industry through technological, purchasing and operational changes (2.7 MtC p.a. by 2020)**

- **Technological, purchasing and operational changes to van and lorry fleets** to spread best practice and reduce emissions by 20% between 2008 and 2020. **2.67 MtC** in 2020.
  - Higher uptake of Freight best practice programme
  - Incentives to buy lower carbon/alternatively powered vehicles (VED)
  - Reduction in light van emission – via technology developments
  - Improvements in energy efficiency, vehicle utilisation and modal shift

**Recommendation 5: Secure the inclusion of aviation in the EU emissions trading scheme (EUETS) + consider a range of other options to reduce emissions (not calculated: lack of evidence on cost-effectiveness)**

- **The inclusion of aviation in the EU-ETS** and consideration of further measures to reduce carbon emissions from the aviation industry.
  - Incentivise carbon efficient technologies through the UK capital allowances scheme
  - Link air passenger duty (APD) more closely to emissions – ring fencing revenues to support environmental initiatives
  - Link other charges (e.g. air navigation & infrastructure) to aviation emissions
  - Championing improvements in air traffic management
  - Develop an environmental efficiency rating scheme for public information.

The 7.1 MtC/year these measures would deliver represent a saving of 14% over emission levels in the baseline year of 1990 and are equivalent to 71% over and above the Government's current plans for transport. We believe our proposals for transport are certainly challenging but reasonable - entirely in proportion to the threat of climate change. They would deliver significant carbon reductions without impinging on the economic and social necessity of travel. We have not argued for the most aggressive application of the individual measures and have had a mind to public acceptability.

## Annex 2: Impact of additional measures proposed by CfIT and by CCC

Measures	Carbon Savings 2020 (MtCO <sub>2</sub> )	Carbon Saving 2020 (MtCO <sub>2</sub> )	Carbon Saving 2020 (MtCO <sub>2</sub> )	Carbon Saving 2020 (MtCO <sub>2</sub> )
	CfIT <sup>(1)</sup>	Climate Change Committee Current Ambition <sup>(2)</sup>	Climate Change Committee Extended Ambition <sup>(3)</sup>	Climate Change Committee Stretch Ambition <sup>(4)</sup>
<b>Cars</b>				
Vehicle efficiency improvements (CfIT target also includes measures to influence car purchase behaviour such as steeper VED bands, company car tax, car labelling, procurement, information)	8.8	4.3	11.6	
Measures to support changes in driver behaviour (smarter choices, eco-driving, speed limit adherence)	6.2		3.2	6.2
<b>Cars total</b>	<b>15</b>	<b>4.3</b>	<b>14.8</b>	<b>6.2</b>
<b>Public transport</b>				
Improved efficiency in bus and rail operations;	1.1		0.6	
<b>Public transport total</b>	<b>1.1</b>		<b>0.6</b>	
<b>Lorries and vans</b>				
Vehicle efficiency and operation of large goods vehicles	6.2	0.3	1.8	1
Vehicle efficiency and operation of vans	3.7	0.4	1.2	2.7
<b>Lorry and van total</b>	<b>9.9</b>	<b>0.7</b>	<b>3</b>	<b>3.7</b>
<b>Fuels</b>				
Biofuels			5	
<b>Overall savings</b>	<b>26</b>	<b>5</b>	<b>23.3</b>	<b>31.7</b>

[CfIT's 'Transport & Climate Change' report, in 2007, used a calculation of a 'million tons of carbon'. For the purpose of comparison, a carbon dioxide equivalent has been calculated].

**Footnotes:**

(1) The CfIT recommendations include a 2.4MtC saving from car vehicle efficiency, a 2.7 MtC saving from sustainable distribution (lorries and vans) and a 2 MtC saving from behavioural measures and public transport.

(2) The CCC “Current Ambition” scenario includes some increase in vehicle fuel efficiency amounting to 5 MtCO<sub>2</sub>.

(3) The “Extended Ambition” scenario includes more radical technology options, together with increased biofuels and demand side measures such as eco-driving, Smarter Choices and enforcement of speed limits. The reduction potential from this scenario is 23 MtCO<sub>2</sub> divided between vehicle efficiency savings of 11.6 MtCO<sub>2</sub>, sustainable distribution savings of 3 MtCO<sub>2</sub>, behavioural measures savings of 3.8 MtCO<sub>2</sub>, and savings of 5 MtCO<sub>2</sub> from biofuels.

(4) The “Stretch Ambition” scenario includes radical technology options for HGVs, stronger take-up of eco-driving and emission reductions from effective speed limit enforcement. The reduction potential under this scenario is 32 MtCO<sub>2</sub>. Additional savings of 9.9 MtCO<sub>2</sub> are achieved through more radical implementation of sustainable distribution savings (3.7 MtCO<sub>2</sub>) and behavioural measures savings of 6.2 MtCO<sub>2</sub>.

### **Annex 3:**

#### **Selected references which may assist assessing the potential for further carbon savings from transport behavioural change**

- Fox J, Rohr C, Daly A, Patruni B and Hyman G (2008) Manchester Motorway Box: Post-Survey Research of induced Traffic Effects, European Transport Conference. (Also other related reports from Rand Europe which investigate empirical and modelling evidence on the sensitivity of destination choice to changes in generalised cost, which may be more important than mode switching).
- Goodwin P (2008) Policy Incentives to change behaviour in passenger transport, OECD/International Transport Forum on 'Transport and Energy: the challenge of climate change', Leipzig, May
- Metropolitan Transport Research Unit (2008) A Low Carbon Transport Policy for the UK, Campaign for Better Transport, London, November.
- Banks N, Bayliss D and Glaister S (2007) Roads and Reality Technical Report, RAC Foundation, London. (especially figure 4.9 and related calculations)
- Steer Davies Gleave (2008) Transport Costs and Carbon Emissions, Campaign for Better Transport, London December
- UK Energy Research Centre (2009) What policies are effective at reducing carbon emissions from surface passenger transport – a review of interventions to encourage behavioural and technological change. *(Forthcoming)*

*(Further work is under way by several other researchers, consultants and institutions).*

## **Annex 4:**

### **Topics for future consideration**

#### *Road Pricing*

Road user charging is to be introduced nationally in the Netherlands in 2014, and the design of the Dutch road pricing scheme is to reduce carbon emissions (as well as congestion). By contrast, the focus in the UK has been on road user charging as a tool to reduce congestion alone. We might say that it would now be timely to evaluate the potential of a well-designed road user charging scheme to deliver cuts in carbon emissions in the UK.

#### *Carbon Pricing*

The issue of cost-effectiveness of carbon reduction and how transport interacts with other sectors is important. The issue of pricing carbon is key (key recommendation of Stern), and needs to be addressed. For example, one might argue that:

(i) Although road transport emissions are outside of ETS, the Govt should develop a clear policy framework through other means (combination of UK tax, EU/UK reg and 'soft' measures) to mimic the impact of ETS carbon pricing, or:

(ii) it should do as in (i), but also go 'further' to promote additional steps (e.g. supporting green travel plans, subsidising public transport), on the basis that either the carbon price is not right, or that there are blockers to efficiency (e.g. lack of information, or existing sunk investment).

There needs to be a clear framework though which ensures the most efficient abatement measures are selected (either by Govt or directly by the market) - which is what carbon pricing is designed to do. Otherwise we risk advocating the 'muesli' recipe.

#### *Government projections*

3. It will be vital for Govt to look again at what we expect from transport (including (UK) international aviation) as part of an overall achievement of 80% reduction in UK GHG by 2050 [NB consideration will also be needed as to what the measurement of GHG not CO2 implies for different sectors].

#### *Cost Benefit Analysis*

There are a range of policy proposals highlighted in this thinkpiece: (i) flexibility on the use of capital spend for 'resource' projects; (ii) pilot projects with Las; (iii) re-assessment of (emissions focussed) road pricing options; (iv) fuel duty escalator. How could they be considered explicitly in terms of the cost of carbon abatement they represent, as well as time?

#### *Governance issues*

CfIT has some concerns that the current structure of powers at local and regional level does not lend itself well to rapid delivery of ambitious targets. There is a need for improvement of functioning at a regional or sub-regional

level, perhaps along the lines of a PTA/ITA structure, but we do not at this stage have specific suggestions for how this should be done. The target at local level requires a specific, clear, local challenge which starts in the very short term and can be tested against achievement on a year by year basis. An annual percentage decrease figure, e.g. 1%-2%, could work well.