SC(3) CR-T6

Sustainability Committee

Inquiry into Carbon Reduction in Wales: Carbon Reduction by Transport

Response from Energy Saving Trust

Introduction

This is the submission of the Energy Saving Trust to the second topic – transport emissions - of the Sustainability Committee's inquiry into Carbon Reduction in Wales.

The Energy Saving Trust was established as part of the Government's action plan in response to the 1992 Earth Summit in Rio de Janeiro, which addressed worldwide concerns on sustainable development issues. We are the UK's leading organisation working through partnerships towards the sustainable and efficient use of energy by households, communities and the road transport sector and one of the key delivery agents for the Government's climate change objectives. Please note that this response does not necessarily represent the view of Energy Saving Trust members.

The Energy Saving Trust operates a number of programmes in Wales including Energy Saving Trust Advice Centres (ESTACs). The agreed development of our Welsh ESTACs into a Sustainable Energy Network for Wales will offer a significant expansion of service, providing energy efficiency, renewables and low carbon transport advice to not just consumers but also community groups and small businesses operating in domestic properties. The service will be launched in December 07, with full service in April 08, with targets requiring a three-fold increase in consumer contacts, reaching over 200,000 people a year.

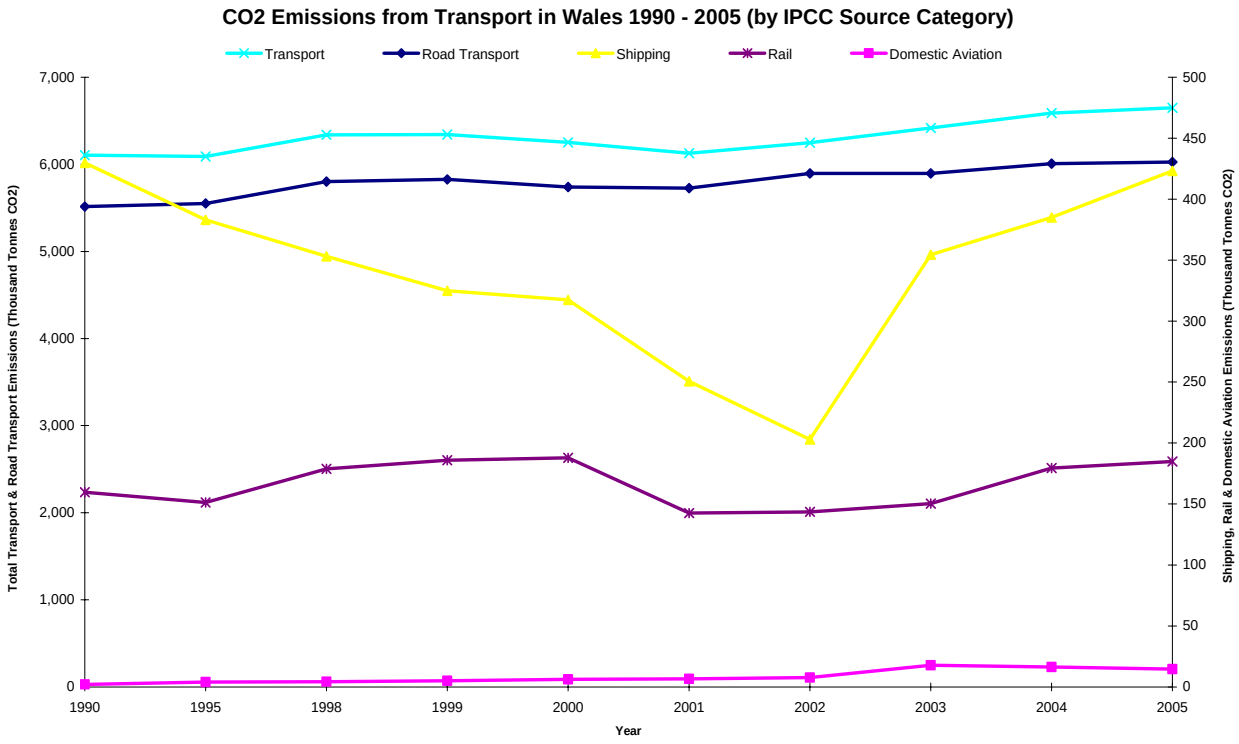
Our response follows the format and order of the consultation document. This submission does not respond to the general questions. Our response to these can be found in our response to the first topic of the Committee's inquiry. For ease of reference this can be found at:
http://www.energysavingtrust.org.uk/uploads/documents/aboutest/Welsh%20Assembley%20Sustainability%20Committee%20Residential%20Carbon%20Reduction%20051007.pdf

Questions specific to transport emissions of carbon dioxide:

3. What particular challenges does Wales face in reducing carbon dioxide emissions from transport, and how can these be overcome?

Wales faces many of the same challenges in reducing carbon dioxide emissions from transport. Many of these challenges are consistent with those faced by the rest of the UK.

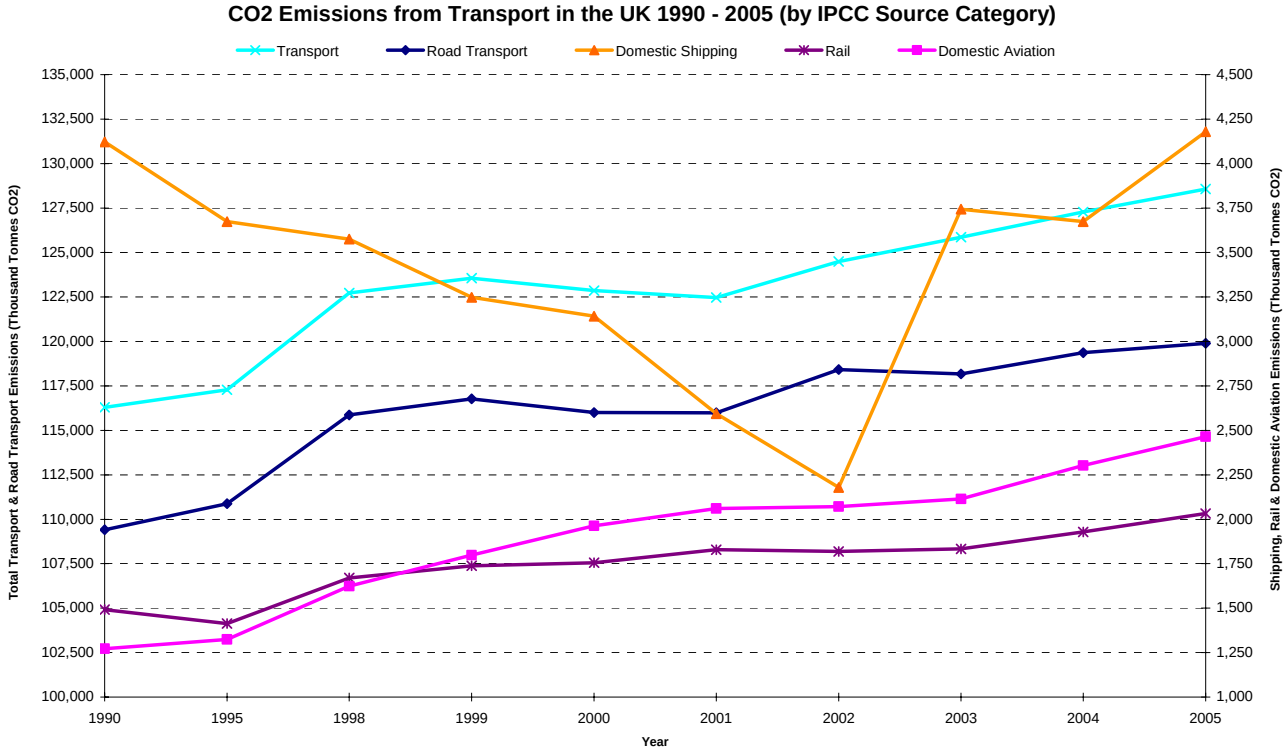
Transport, excluding aviation, is responsible for 27% of UK carbon emissions and these have risen 16% since 1990[1] 93% of these emissions come from road transport.[2] In Wales, as in the rest of the UK emissions from transport continue to rise (see graph below[3]). For ease of comparison the figures for Wales are presented below alongside figures for the UK as a whole. Thus the overall challenge that needs to be overcome is the trend is the upward trend in CO2 emissions in this sector.



[1] Defra, Table 5 Estimated emissions of carbon dioxide (CO2 expressed as Carbon) by IPCC source category, type of fuel and end user: 1970-2005, Defra e-digest environmental statistics website: www.defra.gov.uk/environment/statistics/globatmos/download/xls/gatb05.xls 2007

[2] Commission for Integrated Transport, *Transport and Climate Change*, 2007

[3] **Note:** The figures presented here are emissions by source category and so do not include upstream/indirect emissions from refining etc (i.e. by End User). End User emissions for the whole of the UK but not separately for Wales.



In order to tackle this overall challenge, a number of more specific challenges need to be addressed, these include the key challenges of:

- **Changing consumer behaviour**

Consumer choice is as relevant as technological advances in reducing CO2 emissions from cars. The tables[4] below show significant reductions in CO2 emissions can be made without any new technological developments. If every consumer in Wales chose the lowest carbon car in its class this could produce carbon savings of over 30%. This demonstrates that consumer choice is as relevant as technological advances.

The bottom box in the table shows the CO2 savings that would result if all consumers chose the cleanest vehicle in the market segment. However, this is not a realistic achievement, and the box above shows 'more likely' choices based on an assumption that consumers are more likely to pick a cleaner alternative rather than the cleanest in the segment.

[4] Energy Saving Trust analysis of data provided by the Society of Motor Manufacturers

Change In Wales Average New Car CO2 Emissions Assuming "More Likely" Clean Car Purchasing Habits						
Market Segment	**2006 Average CO2**	**2007 Cleanest Car**	**Min CO2**	**% Reduction for Market Segment**	**No. Reg**	
Dual Purpose	231.1	BMW X3	172	26%	6,097	
Executive	201.4	BMW 5 Series	136	32%	2,276	
Lower Medium	161.0	Renault Megane	117	27%	25,690	
Luxury Saloon	270.3	Jaguar XJ Series	214	21%	284	
Mini	133.0	Suzuki Alto	119	11%	1,111	
Multi Purpose	180.3	Citroen Xsara Picasso	135	25%	4,827	
Specialist Sports	222.4	Morgan 4/4 1800	164	26%	2,172	
Super Mini	142.3	Volkswagen Polo Bluemotion	99	30%	34,816	
Upper Medium	172.8	Toyota Prius	104	40%	9,445	**Change in Average CO2**
Average CO2 / Total Registrations	**163.4**		**115.2**		**86,718**	**-29.5%**

Change In Wales Average New Car CO2 Emissions Assuming "Cleanest Car in Market Segment" Purchasing Habits						
Market Segment	**2006 Average CO2**	**2007 Cleanest Car**	**Min CO2**	**% Reduction for Market Segment**	**No. Reg**	
Dual Purpose	231.1	Suzuki SX4	166	28%	6,097	
Executive	201.4	BMW 5 Series	136	32%	2,276	
Lower Medium	161.0	Honda Civic IMA	109	32%	25,690	
Luxury Saloon	270.3	Jaguar XJ Series	214	21%	284	
Mini	133.0	Aixam A751	108	19%	1,111	
Multi Purpose	180.3	Citroen Xsara Picasso	135	25%	4,827	
Specialist Sports	222.4	Vauxhall Tigra	124	44%	2,172	
Super Mini	142.3	Volkswagen Polo Bluemotion	99	30%	34,816	
Upper Medium	172.8	Toyota Prius	104	40%	9,445	**Change in Average CO2**
Average CO2 / Total Registrations	**163.4**		**111.3**		**86,718**	**-31.9%**

Consumers can also deliver large carbon savings by:

- **Choosing to adopt eco-driving techniques** such as adhering to speed limits, accelerating gently and reducing excess weight from the vehicle, and keeping tyres at the correct pressure[5] (average carbon savings of between 8-12%, with potential savings up to 30%),

- **Choosing less carbon intensive modes of travel such as walking, cycling, car sharing, car clubs and public transport**, and

- **Reducing the need to travel** (for instance by working at home).

These will require different policy interventions to promote them. These policies are discussed in more detail in our response to question 7.

- **Ensuring the development and deployment of low carbon vehicles**

We believe that many of the policy interventions required to ensure the development and deployment of low carbon vehicles in Wales are most cost effectively and practically tackled at a UK and European level. As such we believe that in terms of ensuring the development and deployment of low carbon vehicles the Welsh Assembly Government has a key role to play in terms of positively influencing policy outcomes at UK Government and European levels. Our detailed thoughts on the policies required to ensure the development and deployment of low carbon vehicles in the UK can be found in our recent response to the King Review of Low Carbon Cars. A copy of this response can be found in Appendix 1, and at: http://www.energysavingtrust.org.uk/uploads/documents/aboutest/King%20Review%20Low%20Carbon%20Cars%20200807.pdf. Much of our response to this review was based on our market transformation model[6] for low carbon vehicles[7].

[5] For a list of eco-driving techniquest see: http://www.energysavingtrust.org.uk/what_can_i_do_today/efficient_driving
[6] EST, New Vehicle Purchase Market Transformation Model, 2006

However, there are a number of policy interventions that can be implemented by the Welsh Assembly Government that will have an impact on the development and deployment of low carbon vehicles, in particular changing consumer behaviour (as discussed above, and below), and Government leadership - both local and national (discussed in greater detail below).

In addition to those challenges that Wales shares with the rest of the UK Wales also faces particular issues relating to having relatively high numbers of people living in rural locations which are not well served by public transports. Such populations are therefore highly dependent on cars.

4. Do the current transport policies of the Welsh Assembly Government give sufficient emphasis to carbon reduction?

We believe that there is scope for the transport policies of the Welsh Assembly Government to giver greater emphasis to carbon reduction, and also for the climate change policies of the Welsh Assembly Government to give greater emphasis to the role that tackling emissions from transport can play in terms of mitigating climate change. Our thoughts on specific areas where we believe further action is required are outlined in our response to question 7.

5. To what extent has the Welsh Assembly Government been successful in utilising the powers available to it in order to reduce carbon dioxide emissions from transport?

In terms of policies to address emissions from road transport, we believe that the Welsh Assembly Government should be congratulated for the recent use of the powers available to it – particularly in relation to the funding it has provided for the the development of the Energy Saving Trust's Welsh Energy Saving Trust Advice Centres into a Sustainable Energy Network (SEN) for Wales. This will offer a significant expansion of service, providing energy efficiency, renewables and low carbon transport advice to not just consumers but also community groups and small businesses operating in domestic properties. The service will be launched in December 07, with full service in April 08, with targets requiring a three-fold increase in consumer contacts, reaching over 200,000 people a year.

In relation to reducing carbon emissions in the transport sector there are a number of other examples of the Assembly successfully using the powers available to it, for example its recent announcement of 4 Sustainable Travel Towns (STTs) in Wales. The Towns are demonstration projects for optimising the benefits of smarter choices (teleconferencing, workplace travel plans, car clubs). Results from STTs in England where the Government has invested £2m per year into STTs in Darlington, Worcester and Peterborough have shown significant improvements in public transport uptake (up to +22%) walking (increase up to +29%), cycling (up to +79%) and reductions in car trips (-13% in Peterborough). For further information see: http://www.dft.gov.uk/pgr/sustainable/demonstrationtowns/lettersustainabletraveltowns

[7] Based on a continuation of today's policy regime (and planned policies), the model projects a yearly market share for each technology and the likely make up of UK passenger cars up to 2020.[7] The model allows a wide range of different technologies to be considered and different market intervention options for policymakers.

However, given the substantial powers available to the Welsh Assembly Government in relation to carbon emissions reductions in the transport sector, we believe that more could be done in terms of using the Assembly's existing powers to deliver a low carbon Wales. Specific examples are discussed in greater detail in our responses to question 7 below.

6. Could alternative targeting of Welsh Assembly Government financial resources lead to greater reductions in transport emissions than is currently being achieved? If so, where could additional resources lead to greatest impact? (please provide detail to support your evidence)

We believe that alternative targeting of Welsh Assembly Government financial resources could lead to greater reductions in transport emissions than is currently being achieved. In terms of the additional resources required, many of the policy interventions that we believe would benefit Wales are actually already in place in the other administrations of the UK, and overseas, as such, these are outlined in our response to question 7. To avoid repetition we do not duplicate these here.

7. What examples from other administrations (devolved, UK, and overseas), where other means have been used to achieve reductions in transport carbon dioxide emissions, could be adopted in Wales under current powers?

There are a number of good examples of activities that have been undertaken in other administrations and overseas to achieve reductions from transport. Many of these would benefit Wales and could be adopted under current powers, in particular:

- **The provision of Green Fleet Reviews for organisations in Wales – England and Scotland**
  Green Fleet Reviews provide organisations with tailored fleet management advice to help lower running costs, reduce environmental impact and enhance corporate social responsibility. The Energy Saving Trust, funded by DfT provides Green Fleet Reviews to organisations in England which operate a fleet of 50 or more under 3.5 tonnes, and those with smaller fleets are offered telephone advice, e-service and publications. The Scottish Government also funds the Energy Saving Trust to provide Green Fleet Reviews to organisations in Scotland which operate a fleet of 20 or more under 3.5 tonnes, and again those with smaller fleets are offered telephone information and advice. During 2006/7 we provided Green Fleet Reviews to organisations in England and Scotland with estimated savings of 282,000 t/CO2 lifetime, covering 94,000 vehicles. We are currently exploring with the Scottish Government whether it might be appropriate to expand the programme to include larger vehicles.

  We believe Welsh businesses would benefit from a similar service in Wales, and as a result we have submitted a proposal to the Welsh Assembly Government. We would welcome a positive decision that would allow us to provide this service as soon as possible.

- **Additional support for organisations developing travel plans - Scotland**

While we are supportive of the Welsh Assembly Government's existing support for organisations developing travel plans we believe that enhanced support is required in Wales, in order to maximise carbon savings. The existing support provided to organisations in Wales includes the provision of advice, and of templates to assist organisations in putting together travel plans, and is delivered through 4 regional consortiums of local authorities, and funded by the Welsh Assembly Government.

In Scotland the Energy Saving Trust is funded by the Scottish Government to provide a network of expert consultants that we can call on to develop travel plans for organisations in Scotland. This service is available to organisations with more than 50 employees and/or 10,000 visitors per year. In 2006/7 we provided Travel Plans to 77 organisations (covering 107,465 employees) in Scotland saving 30,400 t/CO2 lifetime. We are currently working on phase 1 of an initiative to develop tools to establish the implementation rates of travel plans and to encourage their implementation.

We recommend the introduction of a similar service in Wales which would complement the current support provided, in much the same way as this work in Scotland complements the work of the Regional Transport Partnerships. This would enable more businesses in Wales, including those that don't have sufficient resource or expertise to develop a travel plan themselves, to make considerable carbon savings.

- **Personalised travel planning**
  The Sustainable Travel Towns in England have offered bespoke travel planning to their inhabitants. In Darlington tailored advice was delivered to 40,000 households with significant results. Walking increased by 15%, cycling by 65% and car use decreased by 9%. The Department for Transport intends to increase investment in these plans across England. Such personalised travel planning could potentially be rolled out through the ESTACs in Wales.

- **Eco-driving – Scotland**
  As noted above eco-driving techniques such as adhering to speed limits, accelerating gently and reducing excess weight from the vehicle, and keeping tyres at the optimum level, when adopted together can lead to average fuel savings of 5-10%.[8] In Scotland we have run an eco-driving campaign for the Scottish Government, which led to a doubling of awareness of eco-driving from 15 to 34% within the target audience of 866,842 commuters into Edinburgh and Glasgow. We believe there would be merit in introducing such a scheme in Wales, to help maximise drivers' miles per gallon and emissions reductions.

- **Emissions Related Congestion Charge - London**
  Initial traffic and congestion reductions arising from the original London scheme led to overall CO2 savings of 16 percent (although recent congestion trends in central London will have eroded some of this benefit). From February the Mayor has proposed to link the charge to vehicle emissions. Cars in Bands A and B (of the vehicle excise duty bands) will not pay the charge, and from Oct 2008 highest emitting cars (Band G) will pay £25, whereas Bands C-F will pay the standard £8.

[8] Commission for Integrated Transport, Transport and Climate Change, 2007

This is to incentivise the purchase of low carbon vehicles, and also reduce the amount of high emitting cars in the zone. If congestion charging is introduced in Welsh cities we believe this should be linked to emissions.

- **Congestion charge – Stockholm**
  Stockholm is the second city in Europe to introduce a congestion charge. The pilot scheme ran from Jan – July 2006 and introduced a permanent scheme in 2007. CO2 emissions during the pilot were reduced by 14% in the zone and 2-3% outside the zone. Traffic mileage fell 15% in the zone. Further information can be found at:
  http://www.stockholmsforsoket.se/upload/Sammanfattningar/English/Final%20Report_The%20Stockholm%20Trial.pdf

- **Cycle Demonstration Towns**
  £17million has been allocated across six towns across England to promote cycling, and initiate 'soft' measures to encourage more cycling. There are no cycle demonstration towns planned for Wales. We would welcome the development of such demonstration towns in Wales.

- **Transport Innovation Fund**
  The UK Government has recently announced £2.5bn for local authorities England to tackle congestion by 2014/15 and £200m for road pricing. This does not extend to Wales. We believe there is scope to consider such investment in Wales

- **Paris cycling scheme**
  The Velib scheme in Paris started in July 2007. 10,000 bikes were available for hire from 750 ranks (for further information see: http://www.timesonline.co.uk/tol/news/world/europe/article2224917.ece). Smaller schemes are also running in London. Again, we believe that there is scope for consideration to be given to the introduction of such schemes in Wales.

- **Public procurement**
  It is vital that national (the Welsh Assembly Government) and local (local authorities in Wales) government leads by example. National and local government should all use the lowest carbon vehicles and use these in the most fuel efficient ways. In this context we note the recent announcement from DfT about their forthcoming Low Carbon Vehicle Procurement Programme. This programme will aim to use the public sector's purchasing power to accelerate market introduction of lower carbon vehicle technologies. For further information please see:
  http://www.dft.gov.uk/pgr/scienceresearch/technology/lowcarbonvehicleprocurementprog

8. In the context of the Government of Wales Act 2006, which further means of reducing carbon dioxide emissions from transport could only be achieved with the introduction of further legislative competence for the National Assembly for Wales?

It is our belief that many of the actions needed to deliver significant carbon emissions reductions in the household sector can be undertaken within the existing powers of the National Assembly for Wales. These are discussed in our response to question 7.

There are a number of obvious exceptions which can currently only be dealt with at a European level or UK level. At a European level these include the Voluntary Agreements with the car manufacturing industry on maximum allowable CO2 emissions from new cars, and the Renewable Transport Fuel Obligation (RTFO). At a UK level this includes taxation, in particular the emissions linked VED and Company Car Tax, and Fuel Tax more generally. While the Welsh Assembly Government does not have legislative powers in these areas, we believe that the Welsh Assembly Government has a key role to play in terms of positively influencing policy outcomes at UK Government level.

9. If specific carbon dioxide emissions targets are to be set for Wales should those targets be subdivided into shares by sector? If so, what share of the total should reductions by the transport sector comprise?

We believe that sectoral targets would be useful. Without detailed modeling work it is difficult to suggest what the target for the transport sector should be in relation to that of other sectors. However, we believe that it would be sensible to expect transport to make at least an equitable contribution to overall targets. We also believe that aviation and shipping should be included in any carbon dioxide emissions target for the transport sector.

In this context we believe that the Committee might find the Defra report 'Synthesis of Climate Change Policy Appraisals, January 2007' of interest, this can be found at: http://www.defra.gov.uk/environment/climatechange/uk/ukccp/pdf/synthesisccpolicy-appraisals.pdf

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15 August 2007

Miss Mel Rich
King Review Team
HM Treasury
1 Horse Guards Road
London
SW1A 2HQ

By email king.review@hm-treasury.gov.uk

Dear Miss Rich,

Re: Energy Saving Trust: Response to the King Review Call for Evidence

The Energy Saving Trust is pleased to respond to the King Review Call for Evidence. Please note that this response should not be taken as representing the views of individual Energy Saving Trust members. Please contact me with any questions at caroline.watson@est.org.uk

The key points raised in our response are as follows:

1. Our market transformation model (MTM) can project progress in the low carbon vehicle market using a range of policy scenarios up to 2020. We are happy to discuss with the King Review team and undertake further modelling work to provide further insights.

2. Without additional (beyond current and planned) policy measures diesel and petrol will be the mainstay technologies until 2015. After this date, only hybrids will show some significant market penetration. Up to 2020 new technologies for low carbon vehicles will fail to significantly cut carbon emissions.

3. To deliver significant carbon reductions from cars further policy measures are needed. We support a technology neutral approach to encourage the uptake of low carbon vehicle technologies.

4. On these timescales, consumer choice and behaviour offer at least as much potential as technological advances. We support policies to maximize these options for reducing emissions.

5. Long term market transformation requires major infrastructure investment, and a forward looking strategy with clear carbon reduction targets for the transport sector.

Yours sincerely,
Caroline Watson
Transport Strategy Manager

Energy Saving Trust: Response to the King Review Call for Evidence

Introduction

EST has produced a market transformation model[9] (MTM) for low carbon vehicles. Based on a continuation of today's policy regime (and planned policies), the model projects a yearly market share for each technology and the likely make up of UK passenger cars up to 2020.[10] The model allows a wide range of different technologies to be considered and different market intervention options for policymakers. We use the results of the modelling to inform our answers to the questions posed by the King Review Call for Evidence. The model does not project over a 25 year period but is useful to estimate what progress will be up to 2020.

Response to questions

Technologies and uptake

1. Which are the transport-related technologies that, over a 25-year period, are most likely to deliver substantial reductions of carbon emissions? What are the environmental and economic implications of these technologies?

Based on a scenario where the market conditions do not change over time, MTM results show that petrol and diesel will be the mainstay technologies until 2015. After this date, hybrids show some significant market penetration, taking market share away from petrol and diesel. Figure 1 below illustrates this. Figure 2 shows in more detail the increase in low carbon technology vehicles beyond 2015.

[9] EST, New Vehicle Purchase Market Transformation Model, 2006
[10] For more detail on the scope and limitations of the MTM see Appendix 1

Figure 1 MTM Results: Total Vehicle Registrations 1995-2020

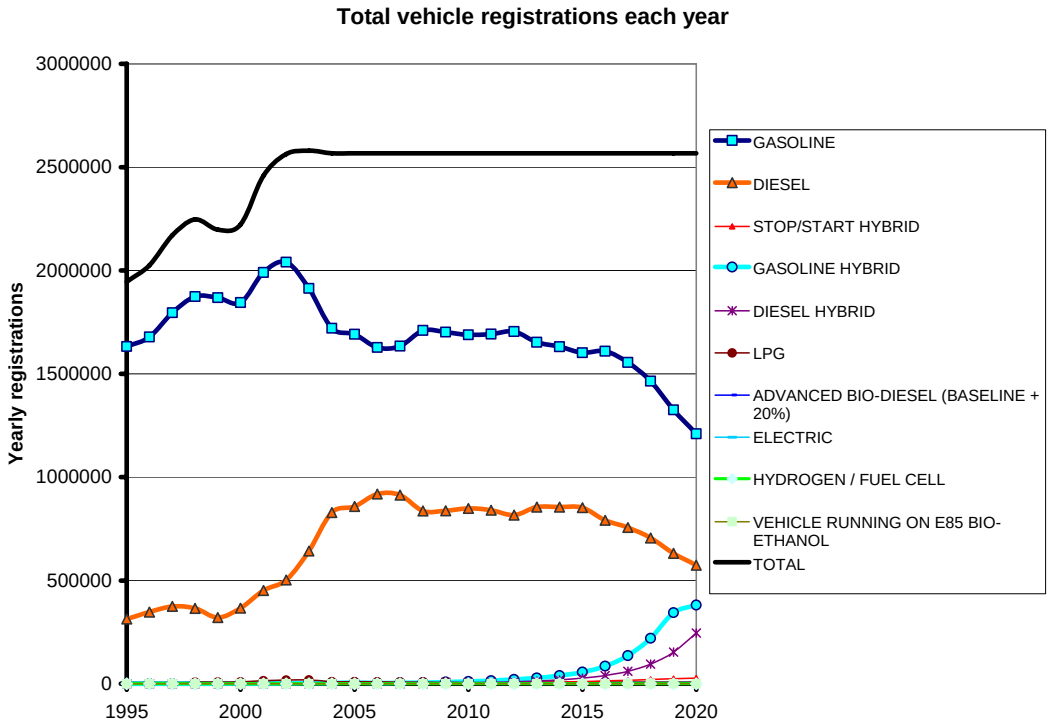
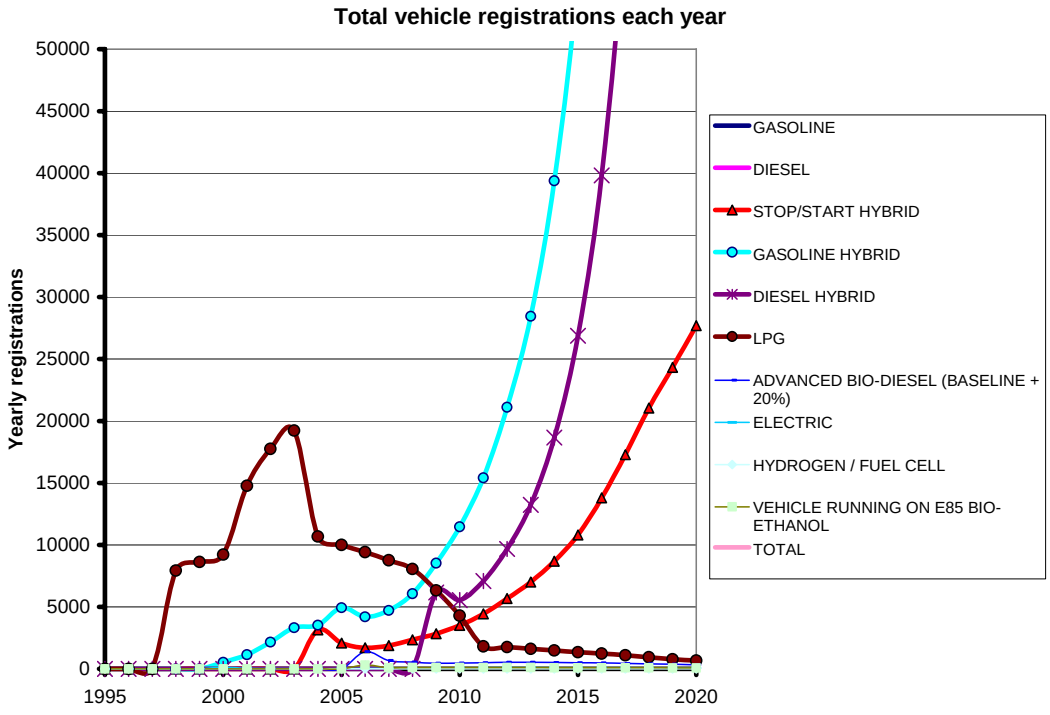


Figure 2 MTM Results: Uptake of Low Carbon Vehicle Technologies 1995-2020 (Basecase)



The graphs above illustrate the penetration of low carbon technologies into the UK vehicle market. After 2015 diesel and gasoline hybrids, stop-start hybrids and premium gasoline are the only low carbon technologies to penetrate the market. Other technologies fail to impact on the market at all.

By 2020, the improvements in vehicle efficiency and the Renewable Transport Fuels Obligation (RTFO) will bring down the overall CO2 emissions of the UK vehicle parc by up to 10%. However, without new policies new vehicle technologies will have little impact on CO2 from road transport. Additional policies are needed to reduce emissions from cars and contribute towards meeting the UK's climate change target.[11]

'Bolt-on' technologies hold potential for immediate and near future carbon savings. Some research shows current satellite navigation technologies could reduce distance driven by up to 16% (and therefore carbon emissions) used compared to normal navigation on unfamiliar roads.[12] GPS devices can also be used in schemes such as Norwich Union's pay-as-you-drive insurance, or to deliver a national road pricing scheme designed to reduce emissions.

2. What applicable insights can be gained from past changes in vehicle technologies?

Rather than 'picking winners' among low carbon vehicles/fuels we support technology neutral policies. Conclusions from the DfT's PowerShift programme give some valuable insight. The PowerShift programme was launched in 1997 to provide advice, information and grants to consumers and businesses wanting to buy cleaner, lower emission, and more efficient vehicles. Grants ranged from £700 to £2,800 depending on vehicle size and helped to build up the Liquified Petroleum Gas (LPG) industry. PowerShift focussed largely on LPG vehicles, with 63% of grants value funding the technology. LPG was unable to compete against petrol and diesel and since grants have been removed there has been little uptake of LPG. According to our model this will continue to be the case (see figure 2). These results demonstrate that there are risks with supporting specific technologies as opposed to introducing technology neutral, emissions based policies and allowing the market to find the most effective solution. However, over the longer term it is unclear that we can get to a low carbon vehicle economy within the means of the existing infrastructure and systemic change would need investment in new infrastructure (see Q.5).

3. Looking out over this 25-year period, what visions are there for how vehicles and emissions will evolve? What will be the critical enablers and/or inhibitors for these particular visions?

By 2020, without additional policy measures, even the penetration of the most significant technology (gasoline hybrid) is limited to fewer than 5% of total UK vehicles and the total low carbon vehicle penetration is less than 9%.[13] Overall, the contribution of new vehicle technologies to reducing average vehicle CO2 will be limited.

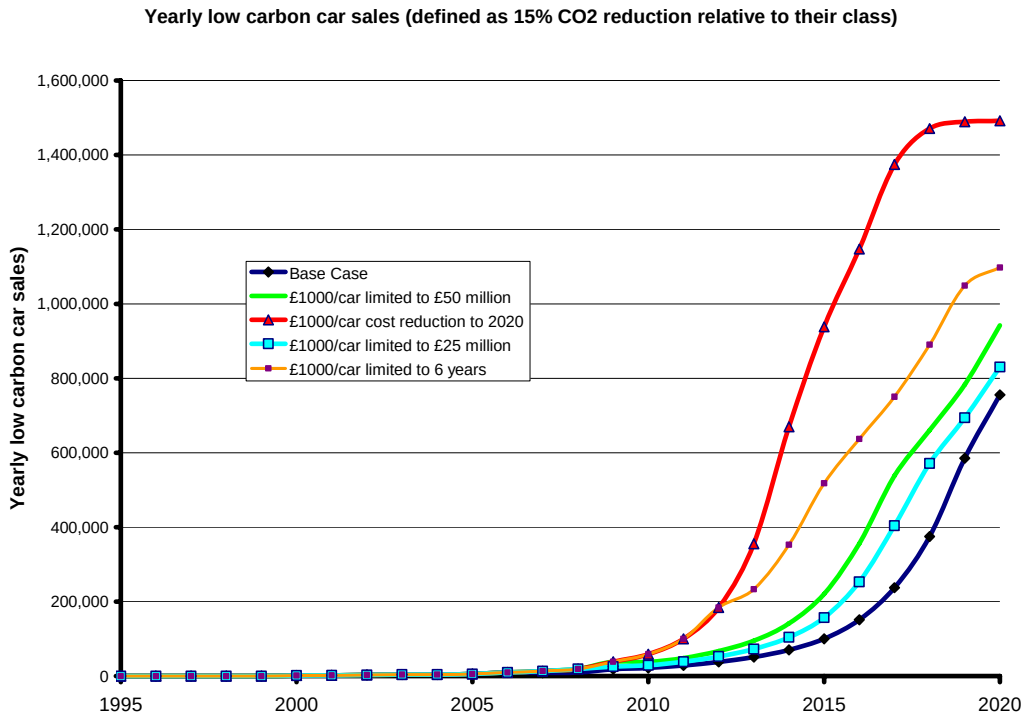
There will be some penetration of gasoline and diesel hybrids, and hybrid stop-start vehicles. But without support their entry will be delayed until 2015. Other technologies such as biofuels, electric vehicles, and hydrogen fuel cells will fail to penetrate the market at all (see figure 2).

[11] The Climate Change Bill will require the UK carbon budget to be at least 26% but not more than 32% lower than 1990 levels by 2020.
[12] TNO, February 2007 http://www.tno.nl/downloads/pb_2007_13_32324_tno_es_uk.pdf
[13] EST, New Vehicle Purchase Market Transformation Model, 2006

The main inhibitor to the uptake of low carbon vehicle technology is the high capital costs of the technology. Further investment in the development of certain technologies would have an impact on their relative market penetration to 2020 and emissions reductions.

We modelled scenarios that include policies to reduce the capital cost of low carbon vehicle technologies to purchasers. The model simulated the effect of reducing capital cost for low carbon cars (low carbon cars are defined as achieving at least 15% reduction of CO2 relative to their class.) The reduction in capital costs was varied across the scenarios. The graph below illustrates the impact of the four policy scenarios in comparison to the base case (current and planned policy).

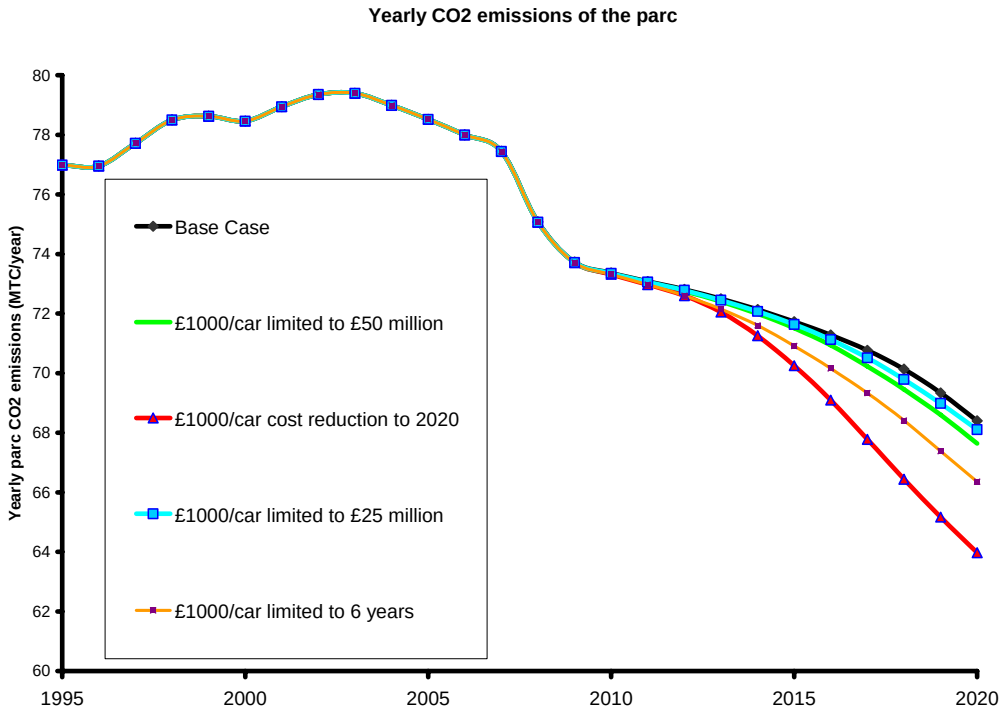
Figure 3 MTM Results: various policy scenarios, illustrating the take-up of low carbon cars



MTM results show that in all scenarios lower costs lead to a greater number of low carbon cars sold. However, hybrids most consistently benefit from reductions in capital costs. Impact on other low carbon technologies is more limited. Other technologies such as those designed to run on biofuels, electricity and fuel cells fail to have an impact on the market in 2020 in all vehicle policy scenarios. High blend biofuel (eg. E85 or B20) vehicles fail to penetrate the market due to the high cost of fuel and the lack of available infrastructure. Our consumer survey shows that fuel cells and electric vehicles are held back because the technologies are assumed to suffer from specific technological difficulties (such as range and recharging issues) which reduce attractiveness to consumers. These are not predicted to be overcome before 2020.

Each scenario reduces emissions, with the potential for CO2 emissions to be over 4 MtC below the base case in 2020. The graph below compares the annual emissions from the UK vehicle parc for each policy scenario and the base case.

Figure 4 MTM Results: Yearly CO2 emissions of the UK vehicle parc under different policy scenarios up to 2020



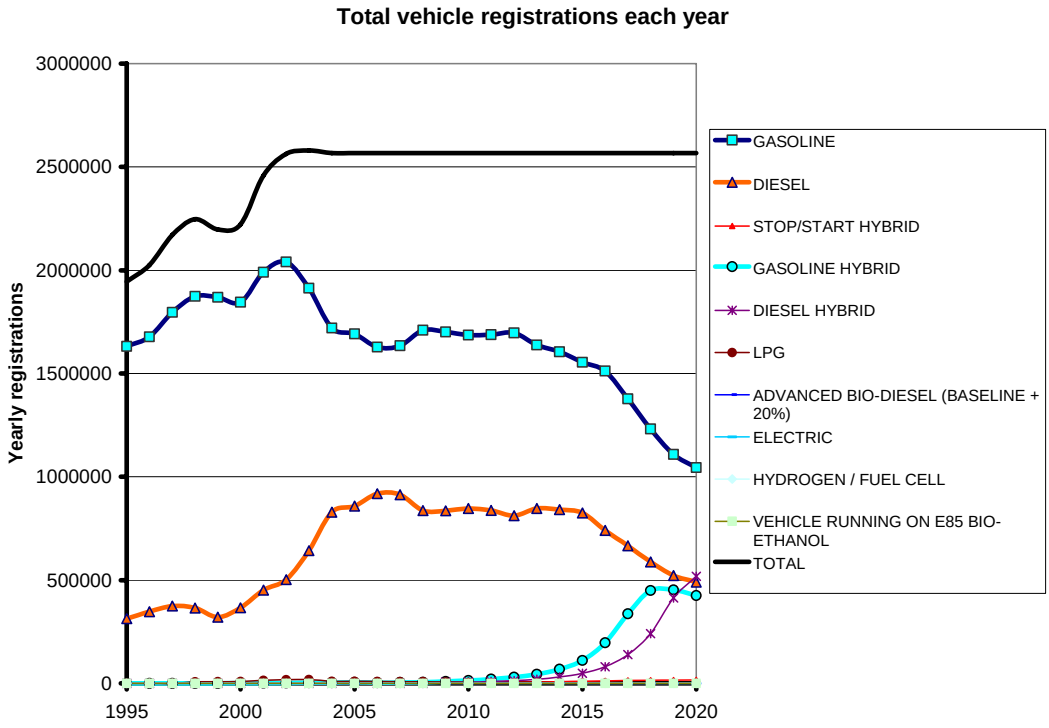
The Government have announced funding of £20 million to support public procurement of low carbon fleets.[14] The programme aims to reduce market barriers to the full commercialisation of low carbon technologies. Figure 3 above demonstrates that the impacts of using this money to reduce the capital costs of low carbon vehicles would alone be small.

Our model can be used to analyse the potential for each low carbon technology in greater detail than is shown in this response. We can explore a range of policy options, and impacts of looking specifically at each low carbon technology (including electric and fuel cell vehicles). The model can analyse the effect of varying attributes of low carbon vehicle technologies such as running costs, performance, vehicle functionality and availability. We are happy to discuss the model further with the King review team and to undertake further modelling work to provide further insights.

Presented below, for example are the results of modelling the impacts of one policy scenario on hybrid technology.

[14] Department for Transport, Low Carbon Transport Innovation Strategy, May 2007

Figure 5 MTM Results: Total vehicle registrations 1995-2020 with policies to reduce capital costs of hybrid technology



The graph shows what the impact would be if we reduced the 'on-cost' (i.e. the additional cost of producing the vehicle, which is passed onto the purchaser through the purchase price) of hybrid technology relative to gasoline and diesel vehicles[15] by £300 from 2009 onwards. This on-cost reduction could be achieved in different ways, for example by undertaking additional R&D on hybrid technology.

Compared to the base case (Figure 1) significant additional uptake of gasoline and diesel hybrid vehicles can be seen. Although it has not been introduced to the market yet, in the long term, diesel hybrid will become more prevalent than gasoline hybrids (mainly due to their improved fuel efficiency and performance).

5. What are the infrastructure implications of low-carbon technologies, and how will these change with levels of uptake?

Current and short-term horizon technologies such as first generation biofuels and hybrids are feasible within existing infrastructure. A 5% biofuel blend that is likely to be used to meet the requirements of the RTFO can be distributed through the existing pumps at the petrol forecourts at no extra cost. Higher blends such as E85 can also be dispensed at existing forecourts with minor alteration to existing pumps, pipes, seals and tanks at cost £4,000-£5000.

We run a DFT funded grant programme to support infrastructure for bioethanol, electricity, natural and biogas fuelled vehicles. The programme also offers support at the demonstration stage for hydrogen. The programme has an annual grant budget of £500,000, and in the first two years the programme has grant funded 27 electric vehicle

[15] In the MTM base case, these are £2,500 for gasoline hybrids and £3,000 for diesel hybrids at low production levels

recharging points, 11 E85 refuelling points, 1 natural gas station and 1 biogas station across the UK. This gives an idea of how much investment is needed to fund infrastructure at current costs.

Over the longer term, market transformation will need investment in new infrastructure. "Plug in" hybrids, full electric vehicles, second generation biofuels and hydrogen fuelled vehicles, whether powered by an internal combustion engine (ICE) or a fuel cell will require additional infrastructure.[16] Future options for electric vehicles (EV'S) include home recharging with export to grid known as vehicle to grid (V2G). Local authorities particularly within the London congestion charging zones are currently incorporating EV recharging points into existing car parks at a cost of £3,000 per unit or as on-street recharging points at £6,000 per unit. This may expand in the future as other areas in the UK introduce congestion charging. Requirements for a hydrogen based transport system could be particularly significant. The cost of a hydrogen station is typically in the region of £1 million. Servicing and repairs for these vehicles would need to be widely available to become attractive to the mainstream market.

Experience shows that uptake follows infrastructure development, not vice versa. For this reason there is a need for clear signals from the Government on infrastructure development. However, the success of hydrogen or electricity based technologies in delivering low carbon transport will heavily rely on the UK's future electricity generation mix. Therefore, there is no urgency to favour specific infrastructure, and it makes sense to take a flexible approach.

7. What in the more immediate term are the technologies that can help drive down carbon emissions?

Technologies ripe for market include first generation biofuels[17] and more fuel efficient vehicles. As noted under Q1, assuming no additional new policy measures or an increase in traffic growth, the RTFO and more fuel efficient vehicles will be the main cause of reducing CO2 emissions from passenger cars up to 2020. Increasing the level of the RTFO to 10% by 2015 (subject to carbon and sustainability standards) could produce further carbon savings from road transport.[18] Results from the MTM also show that with reductions in capital costs hybrids and premium gasoline technologies can penetrate the market and drive down emissions (see figure 4 above).

Over the longer term the development of hybrid vehicle technologies can contribute to the development of electric vehicles. As hybrid vehicles combine electric battery technology with gasoline, any advancement in hybrid electric engines can bring fully electric vehicles closer to the mainstream market. Hybrids can also act also as a portal technology, for instance once fuel cells overcome their economic barriers they could potentially replace the petrol or diesel motor in a hybrid car.

9. What are the choices that consumers face now and in the future that can have an effect on their vehicle emissions?

[16] E4Tech, A review of the UK innovation system for low carbon road transport technologies for the Department for Transport, 2007

[17] First generation biofuels are sourced from food crops, such as maize, rapeseed, palm oil and sugarcane. Second generation biofuels are not yet ready for market uptake but can be sourced from recycled vegetable oil and non-food crops such as straw, timber, woodchips or manure.

[18] The Government intends the level of the Obligation to rise above 5% after 2010-11, provided robust sustainability and carbon standards are met. HMT, Budget 2007

Consumer choice is as relevant as technological advances in reducing CO2 emissions from cars. The tables[19] below show significant reductions in CO2 emissions can be made without any new technological developments. If every consumer chose the lowest carbon car in its class this could produce carbon savings of over 30%. This demonstrates that consumer choice is as relevant as technological advances.

The bottom box in the table shows CO2 savings if all consumers chose the cleanest vehicle in the segment. However, this is not a realistic achievement, and the box above shows 'more likely' choices based on an assumption that consumers are more likely to pick a cleaner alternative rather than the cleanest in the segment.

Change In UK Average New Car CO2 Emissions Assuming "More Likely" Clean Car Purchasing Habits						
Market Segment	**2006 Average CO2**	**2007 Cleanest Car**	**Min CO2**	**% Reduction for Market Segment**	**No. Reg**	
Dual Purpose	234.5	BMW X3	172	27%	175,812	
Executive	201.5	BMW 5 Series	136	32%	100,332	
Lower Medium	159.6	Renault Megane	117	27%	694,440	
Luxury Saloon	268.9	Jaguar XJ Series	214	20%	13,227	
Mini	129.2	Smart ForTwo	113	13%	23,297	
Multi Purpose	182.9	Citroen Xsara Picasso	135	26%	124,851	
Specialist Sports	229.5	Morgan 4/4 1800	164	29%	65,049	
Super Mini	143.1	Volkswagen Bluemotion	99	31%	753,857	
Upper Medium	171.6	Toyota Prius	104	39%	394,000	**Change in Average CO2**
Average CO2 / Total Registrations	**167.2**		**116.7**		**2,344,865**	**-30.2%**

Change In UK Average New Car CO2 Emissions Assuming "Cleanest Car in Market Segment" Purchasing Habits						
Market Segment	**2006 Average CO2**	**2007 Cleanest Car**	**Min CO2**	**% Reduction for Market Segment**	**No. Reg**	
Dual Purpose	234.5	BMW X3	172	27%	175,812	
Executive	201.5	BMW 5 Series	136	32%	100,332	
Lower Medium	159.6	Honda Civic IMA	109	32%	694,440	
Luxury Saloon	268.9	Jaguar XJ Series	214	20%	13,227	
Mini	129.2	Aixam A751	108	16%	23,297	
Multi Purpose	182.9	Citroen Xsara Picasso	135	26%	124,851	
Specialist Sports	229.5	Vauxhall Tigra	124	46%	65,049	
Super Mini	143.1	Volkswagen Bluemotion	99	31%	753,857	
Upper Medium	171.6	Toyota Prius	104	39%	394,000	**Change in Average CO2**
Average CO2 / Total Registrations	**167.2**		**113.2**		**2,344,865**	**-32.3%**

Consumers can also deliver large carbon savings by choosing to adopt eco-driving techniques (average carbon savings of between 8-12%, with potential savings up to 30%), less carbon intensive modes of travel such as walking, cycling and public transport, to reduce the need for travel (for instance by working at home). These will require different policy interventions to promote them.

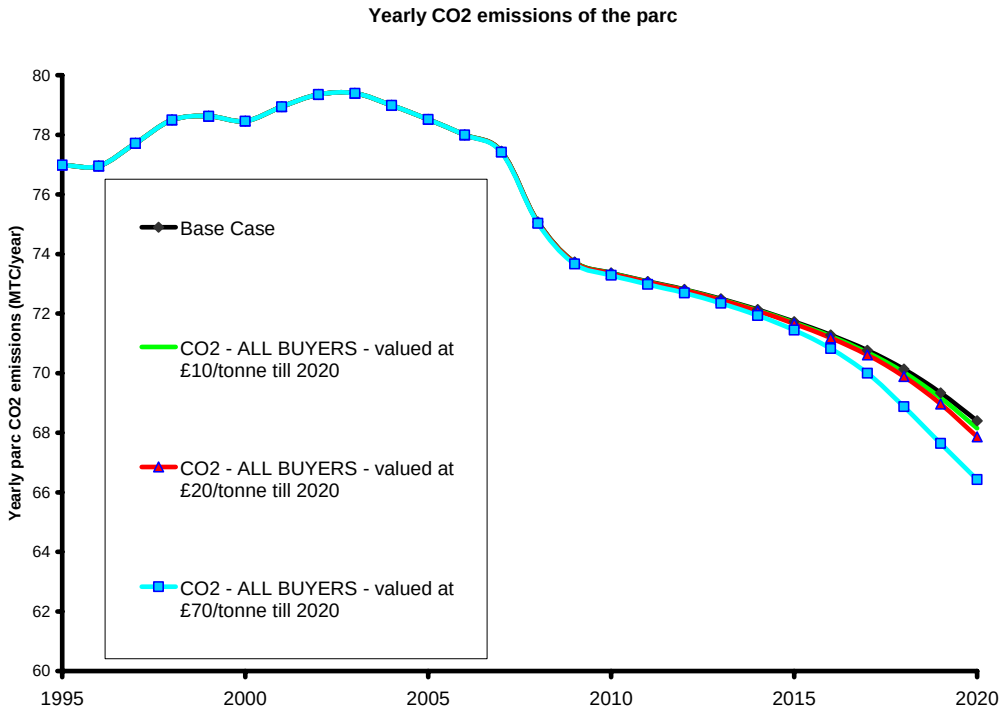
10. How might consumer demand vary over time and what are the implications of this?

When answering survey questions consumers claim to value CO2 when choosing a vehicle. However, consumer behaviour does not reflect this. When choosing a car environmental impacts are very low on the list of priorities for most buyers. Most consumers choose a car based on a number of factors including price, fuel consumption, reliability, size and comfort.

MTM results show that if UK consumers place a value on CO2 this impacts on the uptake of low carbon vehicles. When CO2 is valued at between £10-20 impacts on new vehicle procurement are limited. However, once CO2 sensitivity reaches £70/per tonne of CO2, 300,000 additional low carbon vehicles could be sold each year.[20]

[19] EST analysis of data provided by the Society of Motor Manufacturers
[20] EST, New Vehicle Purchase Market Transformation Model, 2006

Figure 6: MTM Results: Yearly CO2 emissions from the UK vehicle parc under a range of consumer values on CO2



The graph above shows the value placed on CO2 by consumers could potentially produce significant carbon reductions. Policies could be introduced to encourage consumers to value CO2. The DfT could build on its Act on CO2 Low CO2 Top Ten which informs the public on buying lowest emitting cars. The roll out of transport advice through our Sustainable Energy Network (SEN) will offer advice to consumers on choosing lower carbon vehicles. Additional policies could include consumer awareness programs, a CO2 levy applied through the EU ETS, or personalised carbon budgets.

Valuing CO2 is not the only factor to influence consumer uptake of low carbon cars. The lack of knowledge and experience prevents consumer uptake of new technologies. It is assumed consumers apply a penalty to each new technology until a given penetration into the parc is reached. This penalty is known as market inertia. We estimate this applies until penetration reaches 2.5% of the market. Reducing the capital costs of the technology can overcome inertial barriers and bring forward their penetration into the market place.

11. What are the interactions between UK and international markets, both in the development and uptake of vehicle technologies? What are the implications of this?

The interaction between the UK and EU markets is highly significant. The European Commission has proposed that average vehicles sold in the EU must meet a standard of no more than 120gCO2/km by 2012 (130gCO2/km must be met through vehicle technology; further 10gCO2/km can come from complementary measures). In 2005, 83% of all new cars registered in the UK were imported.[21] Therefore EU and

[21] Society of Motor Manufacturers, Automotive Focus Quarter 1 2007

international standards for vehicle manufacturers are highly significant. However, choice of vehicle purchase within the UK is largely driven by tax policy, information and culture.

Role of government

14. To what extent does the Government's role in respect of low-carbon technologies need to be technology-specific and to what extent is a solution-based approach more desirable?

Government policy should be technology neutral and encourage low carbon vehicles regardless of type. Existing policies such as the Company Car Tax and Vehicle Excise Duty are aimed to encourage purchases of low carbon vehicles. Other government policies should reflect this principle. The Renewable Transport Fuel Obligation (RTFO) should only recognise fuels above a certain level of carbon savings (in relation to conventional fuels) and reward certificates according to carbon content (e.g. fuels with carbon savings above 50% receive one certificate, above 70% two certificates and above 85% 3 certificates). However, the scheme must also include sustainability standards to prevent solving one environmental problem by creating or exacerbating another.

16. What is your assessment of the effectiveness of current UK Government policy in respect of promoting low-carbon technologies?

The Government has policy to influence uptake of low carbon fuels (RTFO – see Q14 above). Company Car Tax, new changes to VED, and fuel duty are a step in the right direction in encouraging the purchase of lower carbon and fuel efficient vehicles. However, there is wide scope for strengthening and building on these policies. The great opportunity to reduce emissions by influencing consumer behaviour has yet to be fully realised (see Qs 9 and 10)

DfT should build on its Act on CO2 campaign by supporting effective marketing to promote the choice of low carbon vehicles. This could be complemented with further investment in consumer advice services. The EST's Energy Advice Centres have recently introduced transport experts to advise consumers on buying 'best in class' for CO2, additional guidance on buying lower emitting second-hand cars and smarter-driving advice. To reach a wide audience the EST advice centres approach local businesses to help encourage low carbon travel behaviour. Further investment in consumer advice services, would enable a wider awareness of low carbon travel choices and inform low carbon purchases.

18. What do you think should be the priorities for UK government policy in respect of low-carbon vehicle technologies? What are the best outcomes for the environment and the UK economy, and how can these best be achieved?

In the short term we support technology neutral polices to encourage the uptake of low carbon vehicles (see Q10). Priorities should include strengthening existing fiscal policies designed to favour low carbon technologies. For instance, VED is differentiated for vehicles according to carbon emissions, but its effectiveness could be improved. Our research shows that an increase in VED of 1% can increase the lease costs of a company car by 12%.[22] This is high enough to move buying patterns from high CO2 cars to lower CO2 cars. This is significant as company cars make up 50% of the new car market. Other priorities should aim to improve consumer awareness (Qs 9 and 10)

[22] Energy Saving Trust, Modelling the Impact of VED: A new approach, March 2006

of low carbon travel options, provide advice and maximise potential for behaviour change.

So far strong signals that the transport sector needs to reduce emissions have been lacking. Over the long term a forward looking policy framework, with clear targets for emissions reductions from transport, is needed to develop a low carbon vehicle market. This will include Government investment in new infrastructure to ensure systemic market change (see Q5).