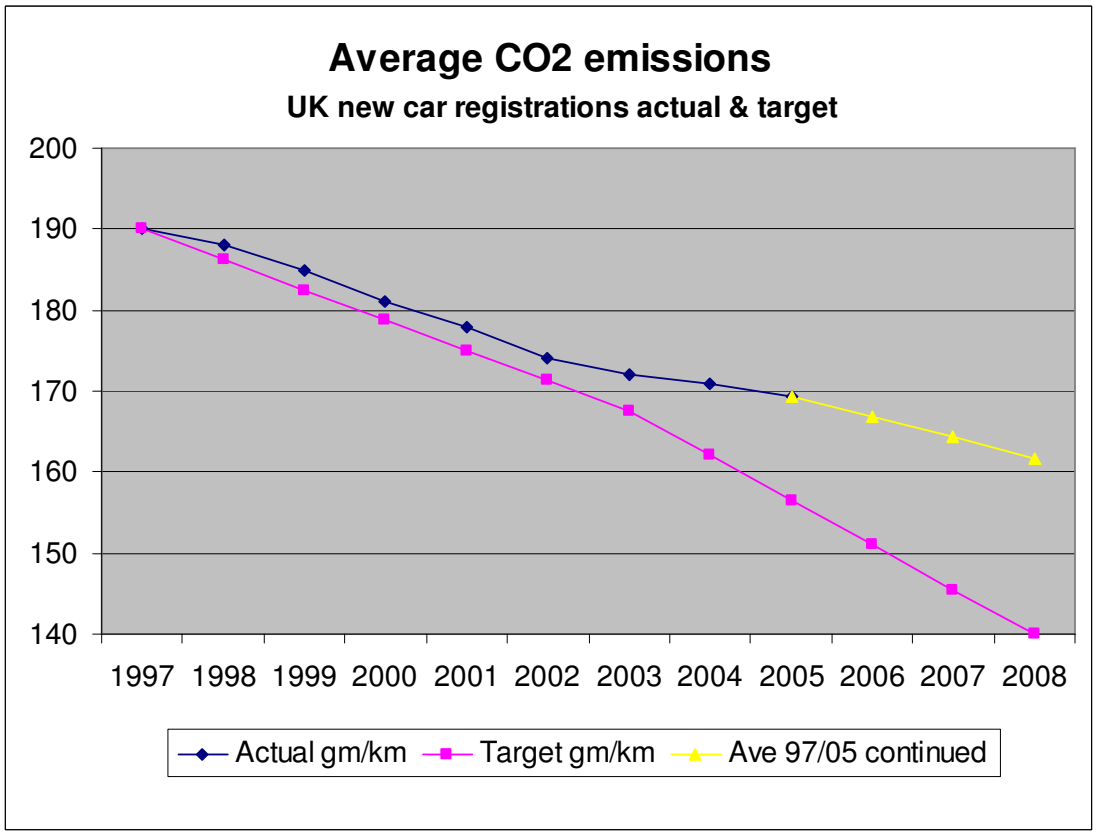
Reducing greenhouse emissions from transport
UK project by MTRU
Discussion note 1
Targets for more efficient cars

The national project on developing UK transport policies and programmes to reduce greenhouse gas emissions will be reporting in 2007. It begins with a section which seeks to put transport emissions in perspective, including a review of current policies. As part of the study process some of the initial findings from this section are being released for debate at an early stage.

The current road transport target

The current centrepiece of Government policy for road transport and climate change is the voluntary manufacturers' agreement to reduce the average carbon emissions from new cars sold. This has been agreed in Europe, Japan and Korea. The European target was to reduce emissions from 190 gms of carbon produced per kilometre to 140 by 2008.

The near certainty of the UK failing to meet its target was highlighted by MTRU last year (2005). Since then a further year's figures have been published and show a slightly worsening position. This is illustrated in an MTRU spreadsheet which is being published for discussion on the net (www.transportclimate.org). A chart illustrating how continuing the current trend will miss the target by over 20 gms by 2008 is shown below.



Source: SMMT published data

It should be noted that much of the carbon reduction in the early years is due to a switch to diesel. While this reduces carbon dioxide emissions, it can increase certain air pollutants, especially particulates and nitrous oxides, compared to equivalent petrol engines. European standards are tightening but, for example, no current diesel car currently meets the stringent Californian Air Resources Board limits for such pollutants and cannot be sold in the 5 US states which have adopted them.

Is it the right target?

The real objective of the voluntary agreement is to improve the efficiency of the UK car fleet and thus reduce carbon emissions. However, the voluntary target for new vehicles is only indirectly related to overall emissions and there is a serious weakness which undermines its validity.

Because the target is expressed in terms of the average fuel consumption of new cars sold, it is perfectly possible for the target to be achieved while the total carbon production of the UK car fleet goes up. For example, if many more new cars are sold, and these are second, third or fourth cars in a household, they are likely to be smaller than the first household car. If a large number of smaller, more efficient, cars are sold, the average fuel efficiency of new cars as a whole will improve. This would happen even if the absolute number of larger, higher fuel consuming cars stayed the same. The smaller cars would represent an increase in car ownership and thus an increase in use. Overall, this would result in an increase in the amount of greenhouse gas produced, at the same time as apparently meeting the Government's key target.

Not only is the target failing to be met, it was inadequately constructed in the first place and is quite likely to be misleading. The fact that it is voluntary and there are no clear mechanisms for the manufacturers to work together to achieve them has been another shortcoming.

Working with the existing data from SMMT and the DfT it is possible to estimate what the voluntary agreement was trying to achieve in terms of overall efficiency of cars in the UK. The policies which follow seek to achieve this in a more secure and effective manner. The voluntary agreement targets will then be achieved, even though the agreement itself is incapable of delivering them.

A new approach to car registration targets

It is not unreasonable to seek an efficiency target for the manufacture of new vehicles, in addition to those needed for their use. Use is, of course, far more important than efficiency and policies dealing with this should be the cornerstone of future transport policy. However, in this particular case a far more sensible target would be to reduce the total carbon producing capacity of the cars owned in the UK. This is defined as the total number of cars multiplied by their potential to produce carbon, (their gms per km).

This would lead to policies which would strongly encourage the sale of much more efficient vehicles and for manufacturers the target for new vehicles should include the total carbon producing capacity of the cars sold. This is just as easy to calculate as the existing measure.

At the same time, the fuel consumption figures used should be adjusted to reflect the actual vehicle sold. This is important because equipment such as air conditioning can significantly alter fuel consumption (by 5-10%). Its inclusion would encourage the use of the most efficient systems and give a more accurate picture of the likely total of emissions.

Leading the market

One of the key objectives is to encourage more efficient cars but this cannot happen unless manufacturers plan to produce enough of them in time to meet the target. This requires clear tax signals (on purchase as well as use) which move consistently in the direction of carbon reduction over a reasonable period of time. It should be noted that simple tax rebates for one technology (such as the previous hybrid rebate in the US) are not recommended. Hybrid power is used in many American models to achieve increased performance at the same or marginally lower fuel consumption. Setting targets in terms of emissions rather than favouring specific technologies also allows manufacturers to exploit the widest possible range of options, from weight reductions to semi-hybrids.

European models such as the diesel hybrid Peugeot/Citroen have been built as prototypes and could be available in the next 2-3 years. They offer 90gms/km of carbon emissions in a mid sized car. It is a true hybrid in that the electric motor and the diesel engine can work separately or at the same time. The issues are how quickly will manufacturers introduce such vehicles and how many will they plan to produce.

There are also many interim technologies less complex than the true hybrid which can reduce fuel use and are simpler to introduce. Examples are switching the engine off when the car is stopped (available already in some models), and using an electric motor for low speeds and switching to conventional fuel as speed increases. In this simpler version the electric and conventional power units are used for different types of driving, rather than also being capable of working together (as in true hybrids like the current Toyota Prius).

Given the long time scales over which people replace their cars and the necessity for rapid action, the voluntary approach is uncertain and has proved completely ineffective. A clear taxation framework for purchase and use is required to give manufacturers the impetus to get the new vehicles into the market in sufficient quantities. The aim would be to place no extra burden on the purchase of a best performing vehicle and only penalise the less efficient. This could be phased in over a 5 to 10 year period.

Carbon tax versus congestion charging

Proposals for the national congestion charge scheme target congestion but are also seen as helping to reduce greenhouse gas. At the moment this is reasonable because in congested conditions cars tend to use more fuel. However, newer technologies will seriously weaken this relationship because they often produce less carbon in congested conditions than in free flow on motorways.

Hybrids, for example, use their electric motors in congested conditions and use the braking system to charge the battery. Most current hybrids are more efficient in stop start conditions than in free flow. Current proposals for congestion charging may be justified in terms of saving business users' time or avoiding the need for road building. However they will be less effective in reducing carbon as vehicle technology changes. They will only contribute if they cause a significant reduction in car use, rather than re-routeing or retiming journeys. Thus if people divert to A roads from congested motorways, their hybrids will consume more fuel than driving round city centres. An indication of this is shown in the US Environmental Protection Agency fuel consumption figures for hybrids attached as Annex 1.

For private cars, increasing fuel duty is simpler than electronic road pricing, and could be introduced immediately. It would directly support achieving the objective which is to reduce carbon emissions.

Work on the national project on transport and carbon reduction is continuing and more detailed proposals across local and national policies addressing issues such as annual targets, the role of bio fuels and demand management are being drafted.

Meanwhile, some indicative work on new financial structures in relation to vehicle efficiency has been undertaken and this is being released, again for discussion, with this note on the current national target.

MTRU
20th October 2006

Annex 1

Hybrids available in the US market

Urban and free flow fuel consumption

Honda Insight:	City 61	Highway 68
Toyota Prius:	City 60	Highway 51
Honda Civic:	City 50	Highway 50
Toyota Camry:	City 43	Highway 37
Honda Accord:	City 30	Highway 37
Ford Escape (2wd):	City 36	Highway 31
Ford Escape (4wd):	City 33	Highway 29
Mercury Mariner:	City 33	Highway 29
Toyota Highlander (2wd):	City 33	Highway 28
Toyota Highlander (4wd):	City 31	Highway 27
Lexus RX 400h:	City 31	Highway 27
Lexus GS 450h:	City 25	Highway 28

These figures represent EPA test numbers, which are commonly 10 - 20 percent higher than real-world fuel economy for hybrid and conventional vehicles.

Source: hybridcars.com
EPA is the US Environmental Protection Agency