

# Phasing out the fossils

*Mike Slinn, Former President of the Institution of Highways and Transportation, explores how government can pave the way for the future of ultra low-carbon transportation...*

**F**ive years ago, few of us in the transport profession would have been talking about carbon emissions, climate change and transport. However, climate change issues have hit us all with great ferocity and we must now react swiftly to this new challenge.

The Intergovernmental Panel on Climate Change (IPCC) was formed in 1998 and has published four assessment reports; the latest was in 2007. The panel noted that the relationship between man-made emissions and temperature rise was first put forward in the 1980s and that there has been increasing certainty over time about this relationship. Climate change is real and is a threat to the planet and life on it.

The IPCC recorded that atmospheric concentration of CO<sub>2</sub> levels were 387ppm in 2008 compared to the pre-industrial level of 280ppm. Between 1995 and 2005, CO<sub>2</sub> levels increased by 1.9ppm per annum and the rate of increase is accelerating. Levels far exceed those from the last 650,000 years.

The climate change impact of rising greenhouse gas emissions, led by increasing CO<sub>2</sub>, has caused surface temperatures to rise by +0.74°C between 1906 and 2005, and they continue to rise at an increasing rate. Sea levels have already risen from 1900 to 2005 by +250mm. By 2095, IPCC

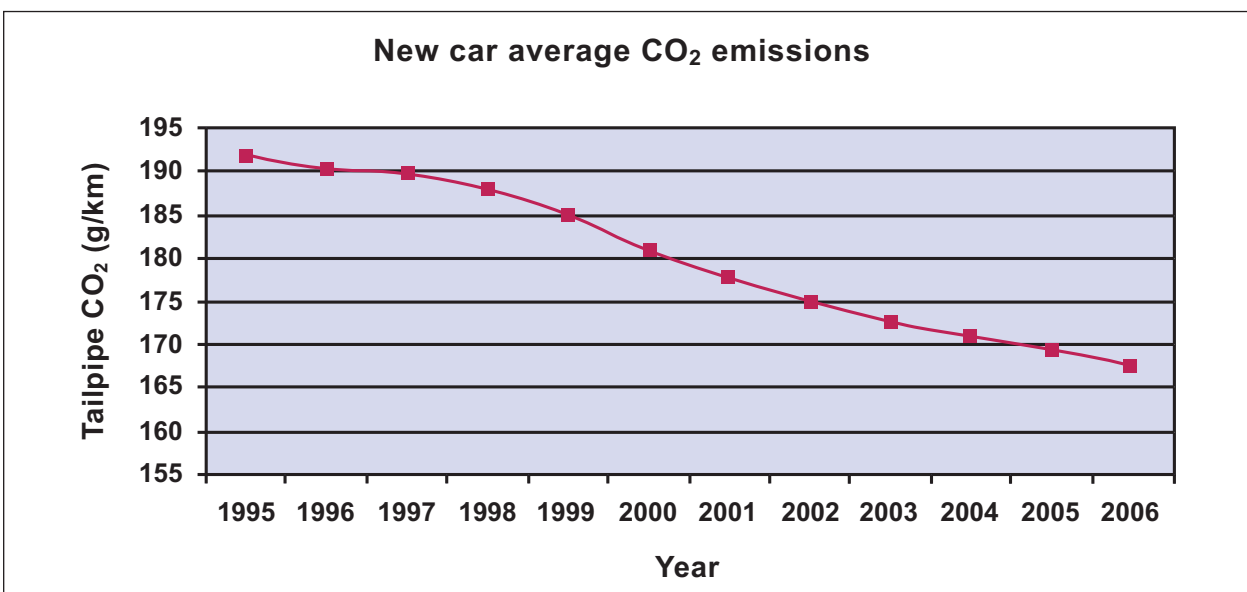
estimates are that temperatures will be 1.1-6.4°C higher and sea levels will be up to 0.6m higher than in 1990 if we don't react.

The IPCC 'Headline' Scenario is that to stabilise temperatures, CO<sub>2</sub> concentrations must peak at 450ppm. This implies that CO<sub>2</sub> emissions in 2050 must be between 50% and 85% lower globally than in 2000.

The government commissioned Lord Stern to prepare a report on the economic consequences of climate change and he advised that, if unchecked, climate change could shrink global economies by 20% and that addressing the problems of climate change now would cost less than 1% of global GDP.

The government has responded with the UK Climate Change Bill, which includes the aim to reduce CO<sub>2</sub> transport emissions below 1990 baseline levels by 26-32% by 2020 and by 80% by 2050.

The government also commissioned Professor Julia King to examine the vehicle and fuel technologies that, over the next 25 years, could help to decarbonise road transport, particularly cars. She found that it would be technologically possible to effect massive reductions in car emissions and that by 2050 an achievable 90% reduction in emissions



*Voluntary agreements with car manufacturers are slowly reducing emissions*

per passenger kilometre would result in an 80% overall reduction in emissions.

In the long term (2050 in the developed world), the King Report found that almost complete decarbonisation of car transport is a realistic ambition. This depends on substantial progress in solving electric or other innovative vehicle and fuel technology challenges and, critically, that the power sector can be decarbonised and expanded to supply a large proportion of road transport demand.

The 2007 UCL Environment Institute Policy report was less optimistic in the short term. It found that we can expect by 2020 that surface transport carbon emissions will rise, not fall. This is due to the relative failure of:

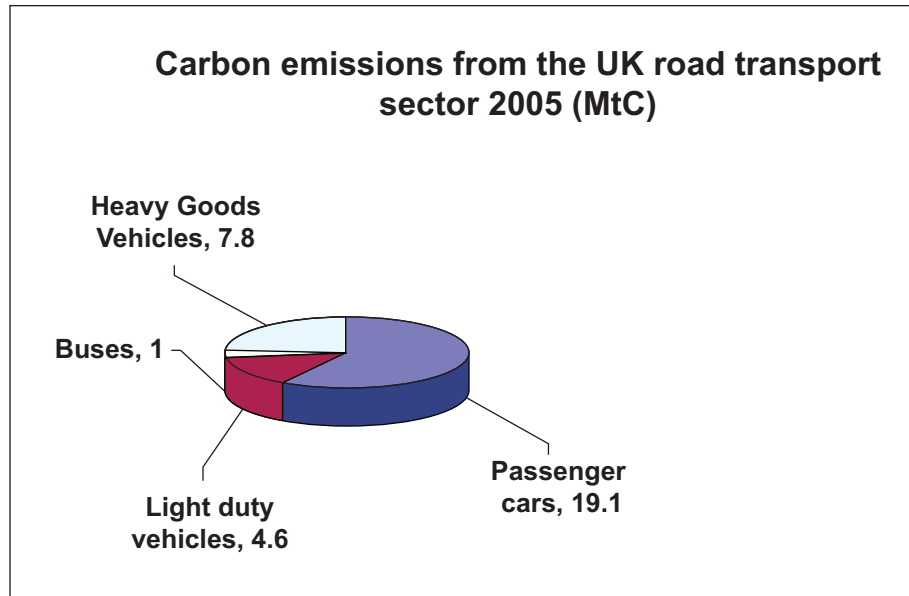
- Vehicle excise duty – not enough differentiation to encourage a change in car purchase;
- Fuel duty escalator – has been abandoned by government;
- Renewable Transport Fuel Obligation – is beset by concerns over global implications of increased biofuel production;
- Voluntary Agreement with car manufacturers – only reducing emissions slowly;
- Dieselisation – has not happened at the expected rate because of the lack of differentiation in fuel duty between petrol and diesel; indeed, now in the UK diesel is much more expensive than petrol.

**Actions to reduce carbon emissions**

The Institution of Highways and Transportation has recently introduced a report on ‘Climate Change and Sustainable Transport – the challenge for transport professionals’. This highlights the need for action in five areas to mitigate carbon emissions:

- Managing demand;
- Changing behaviour;
- Accessibility and social equity;
- Technology and safety;
- Administration and finance.

These action areas should be considered in the context of all the key objectives for transport, which can be summarised under the general heading of ‘Transport for Sustainable Communities’ and include Supporting the Economy, Reducing traffic Congestion, Minimising



Traffic Impact on the Environment and Improving Travel Safety. Generally, the objective of achieving reductions in carbon emissions is compatible with these other objectives. For example, traffic congestion increases carbon emissions because vehicles are less efficient when slow moving. So reducing congestion in a managed way reduces carbon emissions.

**Managing demand** includes spatial planning and hard measures such as parking management and congestion charging, as well as fiscal measures. Spatial planning brings the opportunity to plan and create communities so that the need for motorised travel, particularly by car, is minimised. Congestion charging can ensure that we make the most efficient use of our road network and minimise congestion and its related carbon emissions. We accept that demand for travel by rail and air at peak periods can command a higher price than off-peak travel but have not as yet accepted that the same economic rule can apply to use of the road network.

**Changing behaviour** includes soft measures such as Travel Plans or Smarter Travel Choices which encourage organisations to achieve their own travel needs for staff and visitors whilst exercising their corporate and social responsibility to minimise the amount of travel, particularly by car. There is a strong case for ensuring that future Travel Plans include the responsibility to minimise carbon emissions. The government has also initiated an ‘Act on CO<sub>2</sub>’ campaign, which includes advice on how individuals can minimise their carbon emissions whilst travelling through changing their travel behaviour and the choice of car they buy.

**Accessibility and social equity** is about ensuring that all citizens have good access to essential services; that is employment opportunities, shopping, health and education services. This is achieved through good spatial planning so that these services are near where people live and through providing safe walk and cycle routes and

quality convenient public transport to these services.

**Technology and safety** refers to the research and development required to achieve vehicles with low carbon emissions and to safety improvements to our road network. This includes enhancements to existing technologies and the introduction of new technologies involving the use of ecologically and socially sustainable biofuels, hydrogen and the development of hybrid and electric battery technologies.

This technological development matches the objective of reducing our consumption of fossil fuels both to respond to the impact of carbon emissions and to the finite limit to our fossil fuel resources. Safety improvements have major social benefits but also reduce congestion (and so carbon dioxide emissions) from interruptions caused by road collisions.

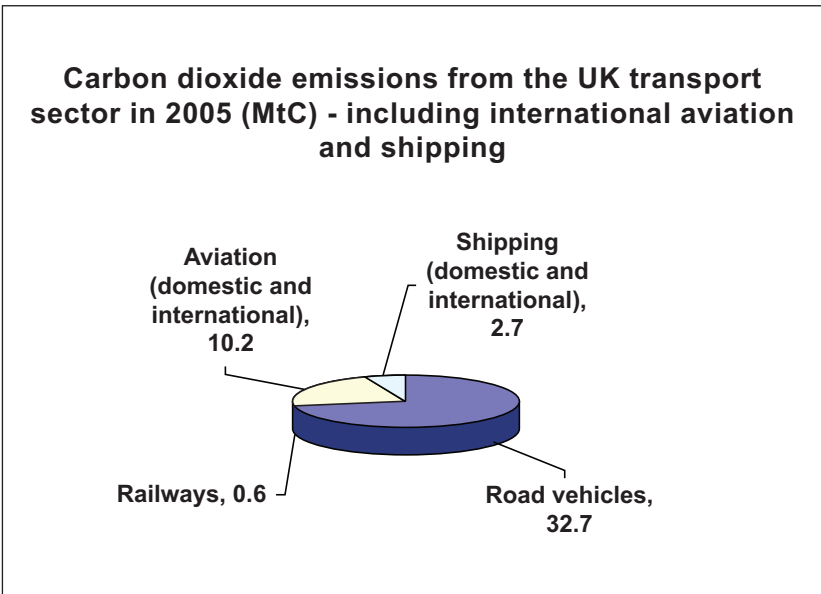
**Administration and finance** includes government's funding and encouragement of research and development into new technologies and also the use of fiscal measures to influence travel behaviour, including the choice people make when buying cars. These fiscal measures include those described by UCL – graduated vehicle excise duty, fuel duty, the Renewable Transport Fuel Obligation and dieselisation – together with international agreements that ensure that car manufacturers continually reduce the carbon emissions of new car models.

Whilst all these measures are needed to reduce carbon emissions, we will also need to adapt to the inevitable increases in peak temperatures and rainfall intensity caused by climate change. This will require improved design to prevent flooding, better drainage, and air conditioning more generally in public service vehicles.

**Non-car motorised travel**

We must not forget that affecting personal travel choices by surface transport, which is what I have discussed primarily so far, is not the total transport picture. There is also a need to minimise the carbon emissions from other forms of transport and from road construction and maintenance activities. Buses, coaches, trains and ships must all be made more carbon efficient. We already see the introduction of more efficient road construction and maintenance methods and materials, which are reducing the carbon emissions from these activities.

Freight movement is a major contributor to carbon emissions. We are fortunate to have an efficient freight industry and have seen a decoupling of freight traffic from GDP with freight traffic growing at a significantly slower rate than GDP. Reducing carbon emissions in freight



vehicles through technology improvements may be more difficult than in cars and we need to look at different ways and means of transporting goods: not just by road, but by rail and water as well. There is scope to transfer road freight to rail or water freight but we will also need to consider introducing fiscal measures to limit the distances goods are moved and that could imply more local production of bulky items such as food.

Air travel is growing at about 6% annually in the UK. Whilst the aviation industry has made major improvements in reducing carbon emissions per passenger kilometre, it does not seem technologically possible to have this increase in air travel and also achieve carbon reductions. We need an international debate on how much we can allow air travel to increase because of the carbon emissions and secondary global warming effects air travel causes in the atmosphere.

However we face these challenges in the future, it is clear that it is politically unacceptable to tell people that they must travel less; because they have perfectly good economic and social reasons for that travel. Our approach to achieving carbon reductions has to be more subtle and has to be based on an understanding of the climate change



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