

THE GRAVITY of the situation is well understood: global atmospheric concentrations of carbon dioxide (CO<sub>2</sub>) are currently (on 2005 measurements) at 381 parts per million (ppm), and rising at 2-3 ppm each year. If we exceed 400-450 ppm then global warming is likely to result in huge climatic difficulties. Essentially we have 10-20 years of current growth before we reach this critical point.

Just how the transport sector can contribute to reducing global CO<sub>2</sub> emissions is, however, far from being well understood, as traffic levels continue to rise year on year – and consequently so do carbon emissions from the transport sector. For governments and the public not to move towards a low-carbon future is becoming increasingly irresponsible, but inertia still remains, and at the moment there is little sign that we will change these disturbing trends.

This difficult issue has been explored by the authors in a recently published study for the Department for Transport entitled 'Visioning and Backcasting for UK Transport Policy' (VIBAT). The headline conclusion from the research is that a dramatic reduction in transport emissions is possible – at least a 60 per cent reduction by 2030. However, technological improvements cannot provide all the answers here – strong action to bring about behavioural change will also be needed. Critically, the full range of traffic demand management measures need to be rolled out *en masse* across the UK. Carbon reduction and improved quality of life objectives need to be placed at the heart of the transport and urban planning agenda: the old mobility agenda has run its course.

The study introduces the research technique of 'backcasting', one of the first times this has been used in the transport planning field in the UK. It considers what the UK transport sector might look like in 2030 if we are to reduce carbon emissions in transport by 60 per cent.

The backcasting approach helps us examine trend-breaking futures by developing a set of alternative future scenarios and suggests the policy actions needed to achieve these 'images of the future' – in 25, 20, 15, ten and five years' time – 'casting back' from the future. The technique was chosen as it is particularly useful for studies (such as those required in the sustainability field) where current trends are taking us in the opposite direction to where we would like to be. The striking part of the 60 per cent emissions reduction target is the change required relative to a 'business-as-usual' projection. A huge change is required (as demonstrated in the graph on the far right).

The study develops two images of the future – one based mainly on behavioural

# Looking over the horizon

A 60 per cent reduction in carbon emissions from UK transport by 2030 is possible, argue **Robin Hickman** and **David Banister**, but only if we can move beyond our complacent car addiction and take radical and concerted action to bring about behavioural, cultural and consumer change

change, the other mainly on technological change. It then provides an inventory of measures available to help reduce emissions, and a series of policy packages which can help to achieve each of the images of the future. These packages are then clustered together to achieve the scale of change required, together with comments on the sequencing of change – identifying the key times at which decisions need to be made.

The research shows that major behavioural change will be required, and that this will account for a large part of our lower-carbon future. Relying on technological improvements to offset our increases in travel will not lead to the required aggregate reductions in carbon emissions. We need to change our travel behavioural patterns as well as implementing lower-carbon means of transport.

There will thus be a major role for a wide range of policy packages – including more walking and cycling; more and better-quality public transport; lower speed limits; integrated land use and transport planning; increased car occupancy (but reduced car use); new ICT (information and communications technology); national

■ **The Executive Summary of the Visioning and Backcasting for UK Transport Policy study – *Looking Over the Horizon* – and associated background papers are available online at <http://www.bartlett.ucl.ac.uk/research/planning/vibat>**

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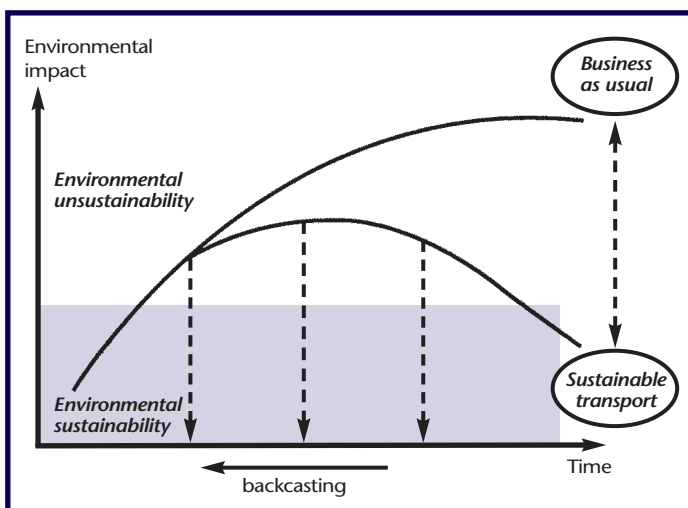
road-pricing (based on environmental impacts rather than congestion); long-distance travel substitution; reduced emissions from freight; and 'softer' factors such as personalised travel planning and car-sharing. People need to change their travel behaviour very markedly in the future.

We will need to achieve European best-practice levels of cycling, walking and public transport – so think Strasbourg, Zürich, Freiburg, Amsterdam and Delft – and replicate this throughout the UK, not just in places like Cambridge, York and London. Heavy investment in cycling, walking and public transport will make a great difference to travel behaviour. This is crucial to successfully reducing CO<sub>2</sub>

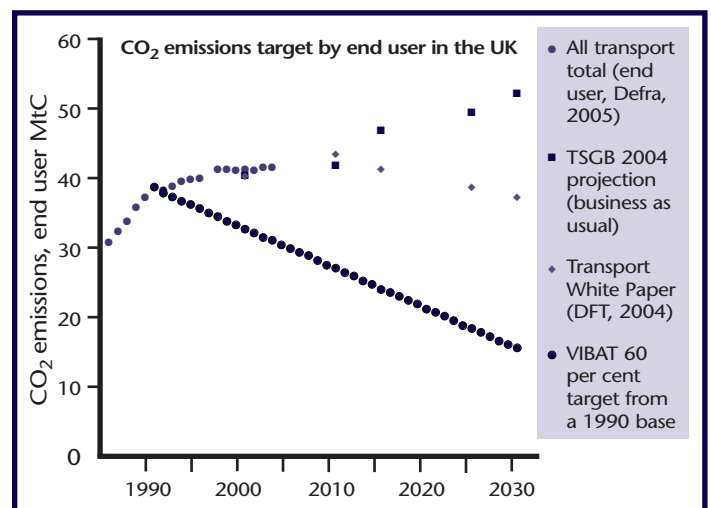
emissions. We should start by radically improving provision in our existing towns and cities, but also plan for improved sustainable transport networks in the new sustainable communities in the UK. This will also have an impact on the quality of the built environment and will provide neighbourhoods that are quieter, safer, cleaner and more attractive than at present.

The transport angle is currently receiving little attention in the climate change, sustainable community, growth area and housing pathfinder debates. This is a serious omission – greater integration of the transport and urban planning debate is required. Recently-cancelled light rapid transit schemes would be viewed very differently under the 'prism' of carbon reduction – one can only wonder why this objective is being given such little weight in transport investment decisions.

The whole rationale for transport investment – including local transport plans, regional transport strategies, the London Mayor's transport strategy, etc. – need 'carbon auditing' and 'future proofing'. At the moment we have little idea how transport investment in the next few years is likely to contribute to the reduction of carbon emissions – yet it



The backcasting approach



The VIBAT baseline and target



*We need to raise our collective game – state-of-the-art walking, cycling and public transport networks are required, integrated with a radically enhanced quality of life in urban areas*

is our investment strategies now that are likely to make (or at the moment more likely *not to make*) the difference in future years. We are, it seems, hopelessly complacent in accepting and perpetuating our car-dependent lifestyles. Surely we can raise our collective game?

Technological change will need to kick-in in parallel with behavioural change. This includes best-practice fuel-efficient vehicles – with hybrid and ultra-efficient ICE (internal combustion engine) cars appearing to be the main possibilities – and alternative fuels – such as compressed natural gas, methanol, ethanol, biodiesel and renewable electricity – all being used in much greater quantities.

We should remember, however, that CO<sub>2</sub> emissions vary hugely between vehicles. The vehicle fleet average in 2004 in the UK was 184 grammes per kilometre and the new fleet (i.e. the latest models) averages 171 grammes per kilometre. We are hoping that under the 60 per cent transport emissions reduction scenarios we achieve a very ambitious total fleet average of less than 100 grammes per kilometre by 2030. By comparison, the current leading-edge technology, such as the Toyota Prius, emits 104 grammes per kilometre.

We should bear in mind that other vehicle choices mean more in CO<sub>2</sub> emission terms – a Porsche Cayenne S emits 380 grammes per kilometre, a BMW 3 Series E46 229 grammes per kilometre, and even the more utilitarian Ford Focus

1.6 emits 161 grammes per kilometre. The supposed ‘sustainable’ sports utility vehicle, the Lexus (RX400h), emits 192 grammes per kilometre. We really need a major push to develop incentives for major change in consumer buying patterns.

The behavioural-technological dichotomy is perhaps too simplistic – both fields are hugely interlinked. To move all fleet average emissions towards the standards of the Prius will mean that everyday car usage in the future is not made in the current highly sought-after vehicles. Even the supposed technological ‘silver bullet’ requires change to individual behaviour and individual consumer choice. The Prius sold about 3,500 vehicles in 2005 (and is priced at over £17,000 – too high



LowCVP

*The Toyota Prius – low-emission vehicles are critical to the lower-carbon future, but are reliant on technological improvements and changes in consumer buying preferences*

relative to the petrol comparator). The car stock is 20 million, so there is a long way to go in terms of cultural change. Bearing these caveats in mind, there is a huge role for the motor industry to play.

A lower-carbon future is based on the premise that a wide-ranging combination of several policy changes, put together in mutually-supporting packages, can add up to major overall change. Central government policy can set the framework within which regional and local government can act, with businesses and individuals changing the emphasis of their actions to support a more sustainable future.

If we manage to achieve all this – and it’s a huge if – then we might get somewhere towards achieving a sustainable transport vision. In policy terms we need all Government Departments – Transport, the Department for Communities and Local Government and Defra, and also the Treasury, Health, Education, and Trade and Industry, for example – to work more closely together on policy initiatives. It certainly means working in very different ways from the way we are at the moment.

Sustainability objectives and reducing CO<sub>2</sub> emissions need to be placed at the centre of the transport and urban planning agenda, so that these key principles inform regional and local planning. Critically, cultural change needs to be fostered. We really should see this as a new age for integrated transport and urban planning – a huge opportunity – with the global environmental imperative as the catalyst for a major improvement in the way we live our lives. Radical and concerted action is required now. We must achieve a consensual way forward rather than stumbling blindly into the future. ■

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#### Further reading

- 1 J. Anable: ‘Complacent car addicts or aspiring environmentalists? Identifying travel behaviour segments using attitude theory’. *Transport Policy*, 2005, 12 (1), pp.65-78
- 2 D. Banister: *Unsustainable Transport: City Transport in the New Century*. Routledge, London, 2005
- 3 R. Hickman and D. Banister: *State of Science Review: How to Design a More Sustainable and Fairer Built Environment – Transport and Communications*. For the DTI Foresight Intelligent Infrastructure Systems, Department of Trade and Industry, London, 2006, and published in *IEE Proceedings Intelligent Transport Systems*, 1(1) (forthcoming)
- 4 M. Hillman and T. Fawcett: *How We Can Save the Planet*. Penguin, London, 2004
- 5 J. Houghton: *Global Warming: The Complete Briefing*. Cambridge University Press, Cambridge, 2004