Institution:
University of Oxford

Unit of Assessment:
17B Geography

Title of case study:
Reconfiguring policy scenarios in transport

1. Summary of the impact

Research at Oxford in the Transport Studies Unit (TSU) has enabled cities and governments (regional and local) in the UK and internationally to adjust their transport policies over the longer term (to 2050) towards low carbon alternatives. Its impact has been to reconfigure decision makers' thinking on transport policies from trend-based projective studies for transport policy options, towards trend breaking 'backcasting' studies for sustainable transport policy futures. Several national and international agencies have used both the backcasting approach, and also two simulation models developed as part of the research.

2. Underpinning research

The backcasting approach establishes a quantitative baseline for the future (to 2030 or 2050), together with a set of interim targets to be achieved at intervening dates, to reduce the transport impact on CO2 emissions, on energy consumption, on environmental factors (safety), on accessibility, on growth, and on other economic factors. Within this framework, visions of different futures are built, and these are seen as normative or desirable futures. Once these visions have been described, pathways are developed from where we might wish to be (in 2050) back to the present time – this is the backcasting process. These pathways combine different detailed policy actions that can be implemented, and the timeline for their introduction. It has been developed under the acronym of VIBAT – Visioning and Backcasting of Transport - www.vibat.org.

Professor Banister and Dr Hickman developed the methodological approach and its application within the transport sector at Oxford University (2008-2013) building on earlier work at UCL (2006-7). Over 120 different transport policy options have been identified, together with a range of complementary actions (e.g. on land use and planning **[Section 3: R1]**). The nature of the actions have been assessed together with their potential for achieving the different targets, and these individual policies are then combined into mutually supporting packages so that the benefits can be locked in, and the rebound effects minimised. Applications of the methodology to London have illustrated the research process and aided the development of the methodology **[R2, R3]**. Throughout this process, the researchers have worked closely with different stakeholder groups, and their inputs have been central to modifying targets, policies and packages **[R4]**.

As part of the research process, a set of interactive tools have been produced so that decision makers and others can test different policy options (TC-SIM), and give weightings to assist in the evaluation of options and targets through a multi-criteria assessment procedure (INTRASIM) **[R5]**. This research is high impact as transport has been the one major sector of the economy where CO2 reduction targets have been difficult to achieve, as the growth in travel has outweighed the benefits of technological innovation. These approaches put a high level of emphasis on social change, and the importance of participatory approaches in understanding the scale of change required and getting the different stakeholders to support change **[R6, R7]**.

The researchers at Oxford University involved in this research: Professor David Banister (2008-

2013), Dr Robin Hickman (2008-2012), Dr Jimin Zhao (2008-2012), Sharad Saxena (DPhil), and Jian Liu (DPhil). Others researchers at Oxford have been involved through the application of VIBAT in EU projects – Dr David Bonilla (2008-2013), Dr Nihan Akyelken (2008-2013), Dr Moshe Givoni (2008-2011), and James Macmillen (2008-2013).

3. References to the research

This research was originally funded by DfT (New Horizons Programme), and subsequently by the EU, UrbanBuzz, Halcrow, Transport for London, Asian Development Bank, Oxfordshire County Council, Oxford Martin School (Future of Cities), Transport Research Laboratory, Institute for Transport Policy Research (Tokyo) and others.

[R1] Banister, D. and Hickman, R. (2009) Techno-optimism: progress towards CO2 reduction targets in transport: a UK and London perspective. *International Journal of Sustainable Development* 12(1), pp 24-47.

[R2] Hickman, R., Banister, D. and Ashiru, O. (2009) Achieving carbon efficient transport: Backcasting from London, *Transportation Research Board* 2139, pp 172-182 – this describes the participatory decision tool and its application in London.

[R3] Hickman, R., Ashiru, O., and Banister, D. (2010) Transport and climate change: simulating the options for carbon reduction in London. *Transport Policy 17(2),* pp 110-125 – this paper outlines the methodology and its application to London.

[R4] Hickman, R, Ashiru, O and Banister, D (2011) Transitions to low carbon transport futures: Strategic conversations from London and Delhi, *Journal of Transport Geography* 19(6), pp 1553-1562 – this paper focuses in the need for stakeholder involvement in scenario building

[R5] Hickman, R, Saxena, S, Banister, D and Ashiru, O (2012) Examining transport futures with scenario analysis and MCA, *Transportation Research A* 49, pp 560-575 – this paper describes the application of the method and the evaluation tool (INTRASIM) in Oxfordshire.

[R6] Banister, D and Hickman, R (2013) Transport futures: Thinking the unthinkable, *Transport Policy* 29, pp 283-293 – this paper describes the scenario building process and an application to Delhi.

[R7] Hickman, R. and Banister, D. (2014) *Transport, Climate Change and the City*. London: Routledge, p. 371 – this major book brings together the conceptual thinking, methodology, policies and case studies.

4. Details of the impact

The impact is described through 6 stages that follow a sequential overlapping timeline:

1. Initially, there was much technical press interest in the study on the Backcasting Approach on UK Transport Policy, funded by the Department for Transport as part of their New Horizons Research Programme. Banister gave both written and invited oral evidence to the House of Commons Environmental Audit Committee in their study on Reducing Carbon Emissions from Transport (HC981-I). Recommendation 14 of the Committee's report stated "The VIBAT study should be an enormously useful resource in that it has quantified different policy instruments and examined the timelines in which they could be introduced and take effect. We were therefore dismayed by the Secretary of State's defensive distancing of the Department from this study. We urge the Department to closely examine the VIBAT study in order to construct an ambitious and well thought-out target, specifically for reducing carbon emissions from transport." (Paragraph 34) The Government response stated that "We agree with the Committee that the kind of work

undertaken in the VIBAT study has an important role to play in developing policy." Ministerial questions were asked on the "failure" of UK Transport Policy with respect to CO2 reductions.

2. The VIBAT London Project built on the UK study through the development and application of a web-based simulation model (TC-SIM) to help simulate the choices available in terms of moving towards carbon efficient transport **[R1, 2, 3, 4]**. This demonstrated the means by which multiple policy measures could be optimally packaged to achieve ambitious carbon reduction targets. The scenario and backcasting methodology of quantifying the impacts of policy measures and assessing the likelihood of targets being met has been used in a number of policy documents, including the Mayor's Transport Strategy (2009), London Plan (2009), and a series of documents at the UK national level: Delivering a Sustainable Transport Strategy (DfT), Carbon Pathways Analysis (DfT), Cutting Carbon, Creating Growth: Making Sustainable Local Transport Happen - White Paper (DfT).

3. The VIBAT approach has been used in a range of international applications - Vancouver (Transport Canada, 2008), Delhi (India, Asian Development Bank, 2008), Auckland (New Zealand, Auckland Council, 2010-11), Jinan (China, Oxford Future of Cities, 2010-2012) and Guildford (2013) **[R4, 6, 7]**. In each case, it has been influential in opening up discussions on sustainable transport pathways with a range of local stakeholders and governmental officials, in getting different decision makers together to discuss options, to help them evaluate alternatives, and to take a more holistic approach to policy making. These impacts are recorded, for example, by the following extracts "…..Topics the group has been discussing include community vulnerability, further developing the Auckland region plan to respond to climate change (Carbon Now) and submitting on the Government's 2010 Draft New Zealand Energy Strategy and Draft New Zealand Energy Efficiency and Conservation Strategy." **[Section 5: C1]** and "MOVED by Director Mendum, SECONDED by Director Derman, that the *Visioning and Backcasting for Transport in Victoria* (VIBAT Victoria) pilot study and associated staff report be received for information. CARRIED" **[C2]**.

4. A second simulation model (INTRA-SIM) has been developed by Hickman with Halcrow Group (UK) to evaluate alternatives using multi-criteria analysis – this allows the CO2 reduction targets to be balanced against other policy objectives (e.g. accessibility, employment, local pollutants, and accidents) **[R5]**. This model has been developed in Oxfordshire (for Oxfordshire County Council, 2009-10) to assist in the development of their Local Transport Plan, the Delivering a Sustainable Transport Strategy, and the Local Sustainable Transport Fund. In Oxfordshire, the Local Transport Plan reported: "As part of the process for assessing the relative value of different scenarios we commissioned the development of a strategic impact model, *intra-sim*. This model takes the results from the county's traffic models and uses these, together with current research, to assess the impact of different scenarios on a variety of outcomes […] This scenario has formed the basis for the strategies outlined in this plan. The results are shown in terms of the relative change from a "business as usual" option of minimal improvement over the 20 year assessment period" **[C3]**. Further evidence of impact comes from the plan's strategic assessment adoption statement which said "A third way that environmental considerations have shaped the LTP3 is through the application of the INTRASIM assessment tool. This was a software tool specifically developed for Oxfordshire to enable the comparison of a number of packages of interventions using a set of common indicators. The indicators which were developed were based upon the previous government's five goals for transport and included environmental indicators." **[C4]**. The model has also been developed in Swindon (for Swindon Borough Council, Department for Transport, 2010-

11), whose Local Transport Plan noted that: "The Department for Transport funded "Swindon DaSTS Study" has allowed the use of the INTRASIM "decision support tool" to carry out an appraisal of the range of options for addressing the key transport challenges for Swindon. This tool tests the impact of applying various policy interventions on a range of indicators. It tests the relative benefits achieved compared to the costs of applying each set of measures in order to illustrate the most cost effective solutions relative to the likely available funding." **[C5]**

5. The approach has been adopted (and adapted) by other researchers in France, Sweden and the Netherlands. The Institute for Transport Policy Studies (ITPS) in Japan has used the approach in their global study looking at a 50% CO2 reduction in transport carbon emissions (1990-2050). Six regional studies were carried out (North and South America, Europe, China, India and SE Asia) with different targets and policy options, all examining alternative futures and different pathways. This project had a Ministerial presentation in Tokyo (February 2011) and there were presentations at COP15 (Copenhagen) and COP16 (Cancun), designed to get transport identified as a key sector for IPCC action **[C6]**.

6. ITPS are now developing the methodology in a study of the ASEAN region, looking at actions that can be taken in Indonesia, Malaysia, Philippines, Singapore, Cambodia and Thailand (2011-2014). Interim progress on this was reported at a major event in Bali (March 2012) **[C7]**.

5. Sources to corroborate the impact

[C1] *Source: Waitakare City Council – 16 Month Report – July 2009-October 2010*

[C2] Visioning and Backcasting for Transport in Victoria (VIBAT VICTORIA) Pilot Study – Final Report *Source: Minutes of a Meeting of the Planning and Transportation Committee, Held Wednesday, October 28, 2009, in the Boardroom, 625 Fisgard St., Victoria, BC*

http://www.crd.bc.ca/reports/planningtransportati_/2009_/10october_/oct28ptvibatreport2/Oct-28_PT_VIBAT_report(2).pdf

[C3] *Source: Oxford Local Transport Plan 2011-2030 p339*

[C4] *Source: Oxfordshire County Council Oxfordshire Local Transport Plan 3 Strategic Environmental Assessment Adoption Statement – April 2011*

[C5] *Source: Swindon Local Transport Plan – March 2011*

[C6]
http://cleanairinitiative.org/portal/system/files/Framework_for_Achieving_Sustainable_Urban_Mobility_in_Asia_-_CAI-Asia_2010_0.pdf

[C7] *Source: Clean Air Initiative and ITPS (2010) International study of transport systems in a low carbon society – southeast Asian Region, March*

http://cleanairinitiative.org/portal/sites/default/files/CAI-Asia_ITPS_STL_March2010.pdf