



Briefing note, January 2014

Roads to a Carbon Free Transport



As CO₂ emission levels continue to rise in the transport sector, decarbonising transport is becoming a challenging issue. This note summarises outputs from a high-level impact seminar organised by University College London (UCL) in collaboration with the Department for Energy and Climate Change (DECC) and the Department for Transport (DfT), in November 2013. This seminar presented recent academic research on the topic and considered its relevance for current policy debates.

Main conclusions from discussions

- Current policies tend to focus too much on technology solutions and not sufficiently on behaviour change.
- Behavioural changes can often achieve more than infrastructure investment for the same price.
- The freight sector is one of the most challenging sectors as technological solutions remain limited. But 'smart logistics' solutions can help, through telematics, route planning, and eco-driving.
- Local authorities play a key role in this sector. They are the experimental ground for change and leverage.
- Academic models and analyses have a lot to offer, but they need to be brought more into the public domain.

Key messages from the presentations

- **CO₂ emissions in transport** are still increasing, as overall global freight and passenger transport (domestic and international) continue to grow
- **Behavioural change** needs to be encouraged in parallel with various technological improvements
- **Backcasting models** are useful tools for policy-makers, to see what needs to be done now to meet longer-term targets, particularly at the city/regional level
- **Reducing CO₂ emissions from freight** is a growing challenge; greater use of zero or low polluting vehicles for the last mile of journeys should be encouraged

Areas for further research

- Scenario testing of ways to achieve major CO₂ emission reductions.
- Potential role of different fuels, including biofuels, for different transport modes.
- The appropriate framework to encourage take-up of ultra-low emissions vehicles.
- The scope for energy savings in existing freight operations.
- Use of smaller/cleaner vehicles for the last mile.

Summary Presentations

“Mitigating CO₂ Emissions in Transportation: Opportunities and Challenges” by Professor Andreas Schafer, Energy Institute, UCL

World wide transport demand continues to increase at a substantial pace, with a switch from slow to fast modes. Even though there are opportunities for technological developments to mitigate rising CO₂ emissions, it is going to be extremely challenging (and expensive) for technology alone to deliver the target CO₂ reductions – particularly for international travel.

There is a need to start altering travel behaviours and attitudes in parallel with technological advances.

Switching to electric vehicles, or using electricity to generate hydrogen to power motor vehicles would require a huge increase in electricity generation and transmission capacity.

Authorities need to decide which combination of instruments to use to implement solutions:

- Market-based and/or regulatory measures?
- Investing in Research & Development, education and training, etc.

The challenge is to implement these solutions whilst:

- Maintaining economic efficiency
- Ensuring consumer acceptance
- Guaranteeing transparency, etc.

Finally Professor Schafer pointed out that there is a need for governments to take the lead in:

- Setting out a clear policy framework
- Putting in place appropriate incentives
- Investing in R&D to reduce fuel consumption
- Encouraging behaviour change

See graph Growth in Global Mobility (1950-2005)

“Transport, Climate Change and the City” by Dr Robin Hickman, Bartlett School of Planning, UCL

CO₂ emissions reduction targets in the field of transport are not likely to be delivered given current progress.

Scenario analysis and modelling of impacts is useful, but of limited value, if political deliverability is not possible.

The default option: vested and powerful interests continue to dominate (e.g. the auto-industrial complex) – and the public remain unaware and disinterested.

Dr Hickman and colleagues have developed backcasting scenario tools to be used by local authorities to explore credible options.

Scenarios developed for London and Oxfordshire show that different futures are possible, and that the 0.5t CO₂ per capita target can be achieved.

The ‘Sustainable Mobility’ scenario assumes that governance is far reaching and effective, and that the car can be disassociated from use in everyday life.

Additionally there is a need to:

- Understand the potential for changed behaviours
- Invest very differently in transport infrastructure, vehicle emission technologies and behavioural change initiatives.
- Change the criteria for transport investment

See graph Scenario Analysis and Backcasting

“Research insights into carbon reduction paths in the freight/logistics sector” by Professor Michael Browne, Faculty of Architecture and the Built Environment University of Westminster

Estimations indicate that freight transport is responsible for 8% of CO₂ emissions world wide.

In central London freight activity is responsible for 25% of the traffic and 20% of London’s ground-based CO₂ transport emissions.

Measures to improve vehicle utilisation include:

- Taxation (including road user charging)
- Financial incentives
- Regulation
- Liberalisation
- Infrastructure measures

Various measures can be used to encourage energy efficiency:

- Raise fuel duty
- Subsidies for driver training
- Enforce or reduce speed limits
- Impose fuel economy standards on new vehicles
- Provide incentives for scrapping older vehicles

Technology options to cut emissions include:

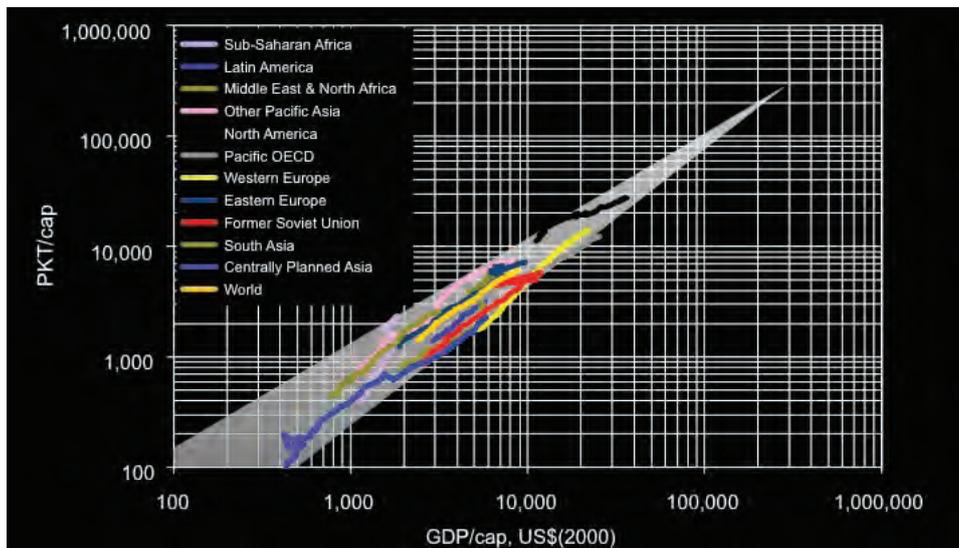
- Change CO₂ content of fuel
- Use hybrid vehicles
- Switch to electric power

Initiatives such as smaller, less-polluting vehicles for the ‘last mile’ of the delivery has proven to be very efficient in cities like Paris.

See table CO₂ Emission Reductions in the Freight Sector

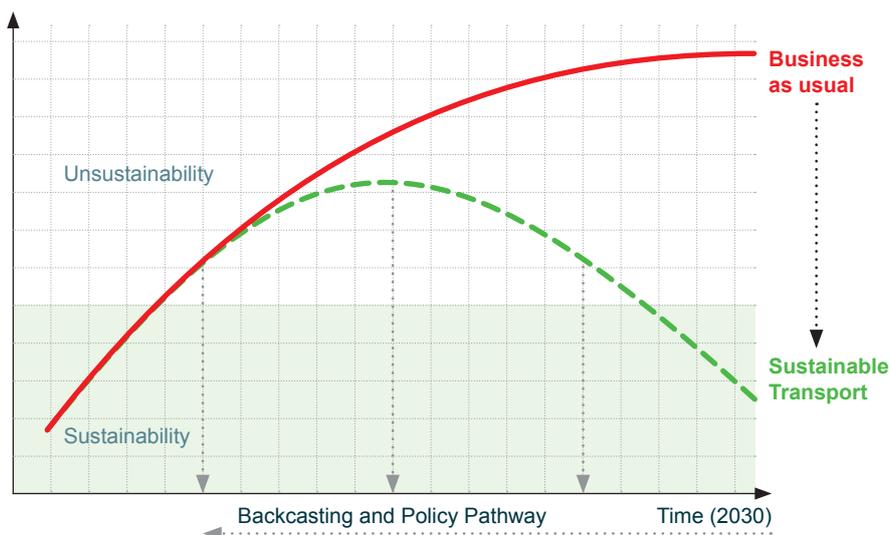
Summary Presentations

Growth in Global Mobility (1950-2005)



Scenario Analysis and Backcasting

- Multy-Criteria Sustainability Impact
- Accessibility
 - CO₂
 - Local environment
 - Economy
 - Safety



Backcasting provides a means of developing and testing normative scenarios – with a policy pathway developed back to the present.

“A concern, not with what futures are likely to happen, but with how desirable futures can be attained.” (Robinson, 1990)

CO₂ Emission Reductions in the Freight Sector

Estimated CO ₂ savings from a set of carbon reducing measures	
Carbon-saving measure	Potential CO ₂ saving by 2020 (%)
Ecodriving training	5
Speed reduction	2
Switch to biofuel	15-20
New vehicle technology	10
Modal shift	3-5
Optimised vehicle size	7-10
Increased vehicle fill	5-10
Smarter city logistics	2-4

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Summary of the discussions

Stronger Behaviour Change Policies needed:

- Policies and research tend to be **too focused on technology** and not sufficiently on the scope for **behaviour change**.
- Introducing effective **Behavioural change policies** will require engagement with actors across all sectors, since travel is a derived demand.
- The academic community should put more research effort into identifying effective **behaviour change measures**, their costs and what impacts can be expected from their introduction.

Strengthening CO₂ Emissions Reduction policies:

- The greatest challenges are in the **freight sector**. Technological solutions to reduce heavy goods vehicles CO₂ emissions do not exist on a large scale at the moment. But **'smart logistics' solutions** can help such as telematics, route planning or eco-driving.
- **Green taxes** and **Regulations** are still **too timid** if they are to be effective signals in the transport and logistics markets.
- **Strengthening the economy** is higher up the political agenda than **reducing carbon emissions**. The challenge is to **even up these two priorities** on the political agenda and in public dialogue.

Role of local authorities is very important:

- Finding ways to **engage with local authorities** is key. Local authorities that currently have well developed carbon reduction strategies tend to be a minority.
- They are under no obligation individually to contribute to the CO₂ emissions reduction targets. Yet local authorities **play a key role** and are the **experimental ground** for change and leverage.
- A **backcasting tool**, such as the one developed by Robin Hickman could:
 - Be used by policy makers to explore alternative futures and encourage 'optioneering'
 - Help demonstrate to local and central government decision makers what can and cannot be achieved in different time scales, what measures cost, what the implications are of a certain course of action
- Models developed by academics, such as the backcasting tools, have a lot to offer but they need to be in the **public domain**.

Strengthening links between academia, policy-making and practitioners:

- Collaboration between **academics** and **government departments** should be increased. One route would be to strengthen links between government's **Chief Scientists** and **academia**.
- Procurement procedures for **framework contracts** should be reviewed to ensure a greater representation of academia.
- Academic centres of expertise, such as the UCL Transport Institute and the UCL Energy Institute, can provide institutional memory and up-to-date knowledge, and form a catalyst for **on-going dialogue between policy makers and academics**.
- Policy-makers could have more input in **influencing academic research agendas**. While academic autonomy is highly valued there is a need to ensure that research helps policy making.

Background

This seminar is part of a programme of activities funded through an EPSRC 'Impact Acceleration Award'. The initiative aims to create bridges between senior researchers, key policy makers and practitioners working in transport to ensure that significant research outputs are rapidly absorbed into policy making and practice, and have practical impact.

This seminar was an opportunity for key policy makers to hear about recent academics' findings and to discuss with the researchers concerned their relevance to policy making and practice.

The following institutions were represented:

- Department for Transport
- Department for Energy and Climate Change
- Department for Communities and Local Government
- House of Commons Library
- Office for Low Emission Vehicles
- Government Office for Science
- Society of Motor Manufacturers and Traders Limited
- Westminster University
- Chalmers University of Technology in Sweden
- Energy Institute, UCL
- Civil Environmental Geomatic Engineering, UCL
- UCL Transport Institute

References

- Schafer, A. (2009). Transportation in a climate-constrained world. Cambridge, Mass, MIT Press.
- Hickman, R., Banister, D. (2013). Transport, climate change and the city. Routledge, London.
- Browne, Michael and Allen, Julian and Woodburn, Allan G. (2013) London freight data report 2013. Technical Report. Transport for London.