**Institution: University of Westminster**

**Unit of Assessment: UoA 16; Architecture, Built Environment and Planning**

**Title of case study: Green freight transport and logistics**

## 1. Summary of the impact

The research into green freight transport and logistics has had several key impacts. It facilitated freight transport becoming part of the London Mayor's Transport Strategy (which aims to improve efficiency and reduce negative impacts of freight) and that this strategy incorporated van-based activities as well as heavier goods vehicles. It provided evidence for policy makers and industry of the potential for modal shift to rail freight and new methods of measuring rail freight activity to inform decision making. The joint development of a technique for calculating fuel consumption and carbon emissions of road goods vehicle activities was adopted by the Department for Transport (DfT) and DEFRA in guidance to industry about emissions reporting.

## 2. Underpinning research

### *Overall research insights*

The research into green freight transport and logistics has been instrumental in introducing novel techniques and methods that address gaps in data availability and analysis which were hindering improvements in freight transport efficiency and sustainability. This research has been taking place over the last fifteen years across several research awards and disseminated in numerous publications. The topic has been sub-divided into three headings below for clarity: i) urban freight transport, ii) freight modal shift and iii) freight transport energy consumption and carbon emissions in the supply chain.

### *Urban freight transport*

Urban freight transport has received relatively little recognition despite it providing for the needs of the 80% of European citizens who live in urban areas and accounting for approximately 20-25% of all urban road traffic. The research has demonstrated the scale and importance of urban freight transport through data collected, and the survey techniques developed are now widely used by other organisations. The development of a framework for understanding urban freight transport in its broadest sense including van, service-related and non-core goods vehicle activity (during an EPSRC research project in 1998-2000) has rectified the omission of these important and growing elements of urban freight traffic from the research agenda. The work has established monitoring techniques, performance measures and benchmarking for urban freight operations, leading to a better understanding of the behaviour of the decision-making processes between supply chain parties. The scope for new urban freight operations using small electric vehicles and changes to distribution networks by means of consolidation have been evaluated. The research has helped support policy-making by providing new insight and data into how supply chains could react to new urban transport policy measures and the effect that this would have on vehicle activity.

### *Freight modal shift*

Rail freight has been one of the major areas of environmental policy-making in transport in Britain. The research has included examination and quantification of specific markets and this has enabled identification of necessary operations and policy actions to encourage greater 'rail/water-friendliness'. This has led to a better understanding of rail (and water) freight activity and trends. The research has involved the development of new video-based data collection methods to monitor the various types of rail freight flows. This approach has also been used to facilitate the investigation of rail freight efficiency in terms of lading factors and utilisation, and the results have identified greater scope for modal shift without the need for major capital funding and been used for the development of appropriate policy measures.

### *Freight transport energy consumption and carbon emissions in the supply chain*

Reducing carbon emissions in the transport sector has proved more difficult to achieve than in many other industries. The research has involved the development of a methodology to assess

energy consumption and carbon emissions associated with freight transport and other logistics activities in various product supply chains. This work has quantified the extent to which these activities and supply chain parties account for energy consumption and carbon emissions, and has thereby identified which activities to target for reduction and who in the supply chain is required to take such action. The research has resulted in the establishment of a standardised approach for the calculation and reporting of energy consumption and carbon emissions which can then be compared across differing supply chains and operations.

All of the above research was carried out by the following researchers: Michael Browne, Professor (1985-present); Allan Woodburn, Principal Lecturer (2004-present); Julian Allen, Senior Research Fellow (1992-present); Jacques Leonardi, Senior Research Fellow (2007-present); Marzena Piotrowska, Research Fellow (2006-present).

## 3. References to the research

***Urban freight transport***

Browne, M. and Allen, J. (1998) Strategies to reduce the use of energy by road freight transport in cities, in Transport Logistics, Vol.1, No.3, pp.195-209.

Anderson, S., Allen, J. and Browne, M. (2005) Urban logistics – how can it meet policy makers' sustainability objectives?, Journal of Transport Geography, Vol.13, No.1, pp.71-81.

***Freight modal shift***

Woodburn, A. (2006) The non-bulk market for rail freight in Great Britain, Journal of Transport Geography, 14, 4, pp.299-308.

Woodburn, A. (2011) An investigation of container train service provision and load factors in Great Britain, European Journal of Transport and Infrastructure Research, 11, 2, pp.147-165.

***Freight transport energy consumption and carbon emissions in the supply chain***

Rizet, C., Browne, M., Cornelis, E, and Leonardi, J. (2012) Assessing Carbon Footprint and Energy Efficiency in Competing Supply Chains: Review, Case Studies and Benchmarking, Transportation Research Part D: Transport and Environment, accepted for publication.

Leonardi, J. and Browne, M. (2010) Method for Assessing the Carbon Footprint of Maritime Freight Transport: European Case Study and Results. International Journal of Logistics Research and Applications, 13, 5, pp.349-358.

**Key research projects**

- London Freight Data and Knowledge Centre (Michael Browne, Transport for London, 2004-present, £300,000)
- Green Logistics (Michael Browne, EPSRC, 2006-2010, £320,000)
- Best Urban Freight Solutions (BESTUFS) (Michael Browne, (European Commission, 2000-2008, £220,000)
- Modelling policy measures and company initiatives for sustainable urban distribution (Michael Browne, EPSRC/DfT, 2002-2003, £75,000)
- Sustainable urban freight and service traffic (Michael Browne, EPSRC, 1998-2000, £40,000)
- Freight modal choice study: addressable markets (Allan Woodburn, Department for Transport 2009-2010, £20,000)
- Energy consumption in the supply chain (Michael Browne, ADEME, 2004-5 and 2006-2008, £10,000 and £30,000)

## 4. Details of the impact

***Approach to dissemination of research findings***

The impact of the research into green freight transport and logistics is detailed below using the same three sub-headings as in section 2.

***Urban freight transport***

The research has had a major impact on the direction of Transport for London's (TfL's) freight knowledge and insight which has fed through into its strategy and policy-making. This has been reflected in the following: i) based on expert advice provided to officials from the Greater London Authority (GLA) and TfL, a definition of freight transport that included both goods and service transport was adopted in the initial Mayor's Transport Strategy (MTS) of 2001 which has been continued in TfL's London Freight Plan (2008) and the revised MTS (2010); ii) provision of detailed insight into freight transport activity by mode and the importance of various logistics sectors together with suitable progress measures and monitoring approaches provided the basis for TfL's London Freight Plan; iii) the research and advice provided to TfL has fed into the development of a range of policy measures to achieve greater freight sustainability (economic and environmental) in London (e.g. Low Emission Zones (LEZ), Freight Operator Recognition Scheme (FORS), Delivery and Servicing Plans (DSPs), freight planning advice for businesses during the Olympics Games, and the trial and evaluation of Consolidation Centres); iv) TfL's application and promotion of urban freight survey techniques and definitions developed in our research (such as freight survey work for the consolidation centre work on Regent Street, and the TRAVL survey); and v) success in building a network of contacts and expertise internationally for TfL including policy makers from other cities (including Paris, New York and several Dutch cities).

The expertise and knowledge developed through the urban freight research led to Michael Browne's appointment to three key positions: i) chair of the Central London Freight Quality Partnership from 2006 to the present; ii) convenor of the WCTR Special Interest Group on urban goods movement from 1999 to the present, and iii) adviser to the Commission for Integrated Transport's Working Group for the "Vans and the Economy" study under the chairmanship of Richard Turner OBE in 2009/10.

The definitions, terminology and survey techniques developed in our EPSRC and other studies have been reflected in government guidance and used by other organisations. For instance the Department for Transport (DfT) guidance report on Freight Quality Partnerships includes a University of Southampton survey form which was based on and informed by our research to include consideration of "core", "non-core" and "service activities" in the urban area.

***Freight modal shift***

The rail and water freight transport research has received considerable reference in DfT publications (e.g. Freight Modal Choice Study, The Container Freight End-to-End Journey). Analysis carried out for the North East Scotland Rail Freight Development Group on rail freight potential was instrumental in the subsequent gauge enhancement of the Central Scotland to North East Scotland rail corridor to better cater for intermodal traffic. Discussion of the research findings with the Rail Freight Group and rail freight operators has allowed them to reflect on the outputs and original data collection efforts in determining their strategies for improvement. The rail and water freight analysis has been incorporated into TfL's annual London Freight Data Report. Based on his expertise Allan Woodburn was appointed as the adviser to the Group of Experts on the Hinterland Connections of Seaports established by the UNECE Inland Transport Committee and Executive Committee in 2008, to determine how the connectivity of seaports and their hinterlands can be improved.

***Freight transport energy consumption and carbon emissions in the supply chain***

The knowledge developed led to the University being invited to be part of the Department for Transport's Low Carbon Supply Chain Steering Group which, in conjunction with DEFRA and the freight industry, developed a spreadsheet-based toolkit for goods vehicle operators to use in assessing transport fuel use and carbon emissions together with an accompanying guidance report. The University was also invited to become a member of the European Norm Committee

CEN TC320/WG10 which established a standard on greenhouse gas emission (GHG) calculation methods for transport in Europe, in cooperation with the British Standards Institute (BSI). The University contributed to the work developing the freight transport-related aspects of the standard. The resulting CEN norm EN 16258:2012 'Methodology for calculation and declaration of energy consumption and GHG emissions of transport services (freight and passengers)' was published in November 2012 and was subsequently published in all EU countries as corresponding national standards (in the UK the BSI norm BS EN 16258:2012 was published in December 2012). Jacques Leonardi was the University of Westminster representative on the CEN and BSI committees.

**5. Sources to corroborate the impact**

***Urban freight transport***

Commission for Integrated Transport (2010) Vans and the Economy, Commission for Integrated Transport (see page 1 for acknowledgement to Michael Browne).

http://webarchive.nationalarchives.gov.uk/20110303161656/http://cfit.independent.gov.uk/pubs/2010/vans/index.htm

Department for Transport (2010) A guide on how to set up and run Freight Quality Partnerships, Freight Best Practice Guide, Department for Transport (see acknowledgement on page i).
http://www.freightbestpractice.org.uk/freight-quality-partnerships-guide/

Transport for London (2008) London Freight Plan - Sustainable Freight Distribution: A Plan for London, Transport for London (see reference on page 74).

http://www.tfl.gov.uk/microsites/freight/documents/publications/London-Freight-Plan.pdf

In addition, the impact of our urban freight research on policy-making in London can be corroborated by:
Head of Freight and Fleet Programmes, Surface Planning, Surface Transport, Transport for London. [Contact details supplied separately]

***Freight modal shift***

Department for Transport (2008) The container freight end-to-end journey: an analysis of the end-to-end journey of containerised freight through UK international gateways, Department for Transport (see references to Woodburn's work on pages 62, 63, 65, 66).
http://webarchive.nationalarchives.gov.uk/20081230093109/http://www.dft.gov.uk/about/strategy/transportstrategy/tasts/userexperience/containerfreight.pdf

United Nations Economic Commission for Europe (2010), Hinterland Connections of Seaports, United Nations: New York and Geneva (see acknowledgement to Allan Woodburn).
http://www.unece.org/fileadmin/DAM/trans/doc/2010/itc/ECE-TRANS-210.pdf

AECOM and Leeds University (2010), Freight modal choice study: Phase 1 Conclusions – Drawing Tgoether Evidence, Final Report, report prepared for the Department of Transport (see many references to University of Westminster's Addressable Markets Study of 2010).
http://assets.dft.gov.uk/publications/freight-modal-choice-study-final-conclusions/mainreport.pdf

***Freight transport energy consumption and carbon emissions in the supply chain***

DEFRA (2010) Guidance on measuring and reporting Greenhouse Gas (GHG) emissions from freight transport operations, DEFRA (see acknowledgement to Jacques Leonardi).
http://archive.defra.gov.uk/environment/business/reporting/pdf/ghg-freight-guide.pdf

Low Carbon Transport Steering Group (2010) Third party Road Freight $CO_2$ emissions pilot model (provided by DEFRA along with above guidance). Excel spreadsheet available at:
http://archive.defra.gov.uk/environment/business/reporting/pdf/lct-steering-group-carbon-em.xls

Department for Transport (2008) Delivering A Sustainable Transport System: The Logistics Perspective, Department for Transport (see reference to our work on page 68).

http://webarchive.nationalarchives.gov.uk/20100528142817/http://dft.gov.uk/pgr/freight/dastslogistics/dastslogisticsperspective.pdf