

## Sub Project 4 – Sustainable Development – Urban Transport

Note: This sub-project will be closely linked to Air Quality; the research groups will meet jointly from time to time. The Dublin Transportation Office (DTO) have agreed to engage with the project.

### 1. Project Statement

The car offers people the freedom and independence to choose to live in less densely populated, more amenable areas and to use their cars to carry out the daily commute to city centres and towns (Ahern, 2002). However, increased car dependency has led to more congestion in towns and cities and to urban sprawl. Some of the associated problems of traffic growth include environmental problems such as air and noise pollution, particularly at the peak hour (Kelly and Clinch, 2001). In order to reduce private car use, a range of measures can be introduced such as instigating transport demand management measures, encouraging the use of more environmentally friendly fuels or providing alternatives to the car.

The objective of this work package is to utilise the SATURN<sup>10</sup> model, SCATS<sup>11</sup> data and ongoing Irish transport research projects to investigate sustainable urban transport scenarios through analysis of transport policies such as improved public transport systems, employer public transport initiatives and congestion/parking charges. The impact assessment will consider associated externalities both positive and negative. Further objectives of the project include an exploration of the potential linking of SATURN and SCATS to both the MOLAND model and noise and air pollution modelling efforts to contribute to one of the overall project objectives of creating an integrated policy assessment tool.

### 2. Objectives and Targets

The objectives of this work are:

- To identify possible urban transport scenarios in the Dublin region (different combinations of public transport, demand management and levels of bio fuel use).
- To calibrate the SATURN model using relevant contemporary Irish data. These data are to be sourced from ongoing projects which look at the price sensitivity of Irish motorists, congestion and parking pricing policies, public transport improvement assessment and a transport case study of the Malahide corridor<sup>12</sup>. Once calibrated the objective will be to assess the impacts of various policy scenarios on traffic levels and the environment in the Dublin region through use of the SATURN model.
- To utilise SCATS data to examine the current state of traffic volumes and the variability of these volumes to various temporal factors.
- To investigate, and as far as possible develop, links between the SCATS data system, SATURN and the MOLAND model. Ultimately seeking to combine these various systems into a policy analysis tool.
- To link this work package and outputs relating to traffic levels from various scenarios to the work packages concerned with noise levels, ambient air pollution levels and climate change. Specifically, seeing if the impacts of a quantified change in traffic volumes and travel behaviour can be related to changes in noise, air pollution and greenhouse gas emission levels.

### 3. Review of State of Knowledge

Governments recognise that in order to get people out of their cars it is necessary to give them choices of how to travel (Johansson-Stenman, 1999 and Bonsall, 2000). It is generally accepted that providing more and better public transport infrastructure does this. However, provision of a good quality public transport is no guarantee that it will be used. Even integrated, modern public transport systems will not always attract the car user. The commonest reason for building light rail systems in the UK, for example, is to reduce traffic congestion although systems in the UK have met with very varying degrees of success in achieving this (Mackett and Edwards, 1998). In some cases improving one mode of public transport can simply result in public transport users swapping from bus to light rail, for example (Banister and Marshall, 2000). Improving public transport can stop the decline in public transport use but the potential impacts on car drivers are more difficult to ascertain.

Therefore, some form of push factor, such as congestion charging or high parking charges, is also necessary to bring about a significant modal shift. Other factors that can also help to reduce car use are employer public transport initiatives. It is evident, therefore, that integrated transport measures are needed to bring about a real modal shift from car to public transport and to result in a sustainable transport system. Even with a significant modal shift the negative impact of transport on the environment is quite significant so the use of alternative fuels in automated transport needs to be addressed. This project will attempt to assess how different measures can be combined to create a sustainable transport system and to assess the impacts of this system on the environment.

11

SCATS data is traffic volume information derived from loop detectors across Dublin city

12

Ongoing and completed research projects within UCD, PEP and UII, including research on parking pricing and congestion charging, use of dedicated bus corridors, economic and environmental impacts of biofuels, and light rail.

## References

- Ahern, A. (2002) How do we make new public transport systems more successful? In: Volume 1, Traffic and Transportation Engineering, page 5-12.
- Banister D. and Marshall, S. (2000) Encouraging Transport Alternatives: Good Practice in Reducing Travel, London, The Stationery Office.
- Bonsall, P. (2000) Legislating for Modal Shift: Background to the UK New Transport Act, *Transport Policy*, Volume 7, pp. 179-184
- Johansson-Stenman O. (1999) Regulating Road Transport Externalities: Pricing Versus Command and Control, in Sterner T. (ed.) *The Market and the Environment*, Cheltenham: Edward Elgar
- Kelly, J. A and Clinch J. P, (2001) Traffic congestion in Dublin -Past, present and Future, presented at the RIO+10 conference 2001 in Dublin.
- Mackett R.L. and Edwards, M. (1998) The impact of new urban public transport systems: will the expectations be met? *Transportation Research A*, 32, 4,231-245.
- Verhoef, E. (1994) External Effects and Social Cost of Road Transport, *Transportation Research A*, Vol. 28, Issue 4, pp. 273-287
- Verhoef, E. (1996) *The Economics of Regulating Road Transport*, Cheltenham: Edward Elgar

## 4. Description of Work

1. This project will identify different transport scenarios for the Dublin region. It will use the Malahide corridor as a case study.
2. SCATS data will be utilised to assess current traffic volume and traffic variability levels in the case study area.
3. Current on-going research concerning demand management, public transport development and employer public transport initiatives will be used to calibrate scenarios for testing within the SATURN model. When designing the scenarios, the following will be taken into account:
  - a) Provision of different levels of public transport: The modal shift associated with Quality Bus Networks and Luas lines will be modelled.
  - b) Demand management: The scenarios will test the impact of parking charges and forms of congestion charging on traffic levels in Dublin.
  - c) Bio fuels: The impact of different levels of bio fuel penetration on energy use will also be assessed.

## 5. Project Management

Dr. Aoife Ahern will assume overall responsibility for the management of this work package, with assistance from the Project Manager.

## 6. Expected Results

The study will provide recommendations of how different transport policies (such as public transport provision and demand management) should be combined to provide a more sustainable transport system.

A key goal of this study will be to establish a methodology for the testing of potential urban transport scenarios, which may be readily adopted for future policy assessment. It is intended to use SATURN to model the different transport scenarios and to examine the impacts on the environment.

Through an investigation of the possible integration of SATURN, SCATS, the MOLAND model and outputs from the work package on noise and air pollution research, this work package aims to contribute to the development of a more comprehensive policy assessment tool.

## **7. Composition and Experience of Team**

The CV's of the team can be found within the appendix.

**Dr. Aoife Ahern** is a lecturer in UCD's Department of Civil Engineering, who has been engaged in transportation research since completing her PhD in UCL in 1998. Dr. Ahern's PhD looked at the potential impacts of new public transport systems on travel behaviour, for which she developed a model to look at those impacts. Dr. Ahern's main research interest is focused on looking the impacts of public transport and at how to model these impacts.

**Dr. Andrew Kelly** is a Project Manger in UCD's Department of Planning and Environmental Policy. Dr Kelly completed his International Bachelor of Arts degree in Economics and English in 1999 at University College Dublin, with his year abroad spent in Universidade de Coimbra, Portugal. Following this, he then completed a MSc in Environmental Policy in 2000 at the UCD Department of Environmental Studies in the area of transport demand and parking policy. In 2003 he submitted his Ph.D (awarded 2004) from the Department of Planning and Environmental Policy. His topics of interest are transport demand management, transport planning, transport modelling, commuter behaviour, emerging transport information technologies and policy development.

**Ms. Lisa Ryan** is a Post Graduate Researcher in UCD's Department of Planning and Environmental Policy. Lisa Ryan's research focuses mainly on the application of economic instruments to achieve optimal National and European targets in transport greenhouse gas emissions. Another area of research focuses on the effect and instigation of technological change and its influence on greenhouse gas emissions and energy sustainability.

## **8. Facilities/Capabilities**

All necessary licenses and permissions have been obtained for use of the SATURN model and the SCATS data system.

## **8. Declarations on Other Sources of Funding and on Tax Clearance**

UCD, TCD and NUIM rely on this funding to cover marginal costs and have not sought additional funding; whereas ERA-Maptec provides 50% funding through their own sources.

University College Dublin will provide a current Tax Clearance Certificate, on request from the Environmental Protection Agency.

## **9. Compliance with National Policies on the Environment, Gender and Poverty**

Urban Institute Ireland (UII), UCD (Project leader) UCD conforms with the university policy with respect to best practice in the areas of ethics, the environment and socio-cultural matters, including poverty. In particular, this project focuses on the development of an in-depth understanding of the environmental issues associated with urban areas. University College Dublin has an Equal Opportunities Committee with the brief to support Gender Mainstreaming within the university.