



UNITED  
BY OUR  
DIFFERENCE



## Irish National Transport Model

### Feasibility Study

Environmental Protection Agency, Department of  
Transport, National Transport Authority

2011

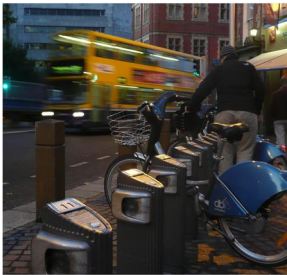
---

**WSP Ireland  
Merchant's House  
27-30 Merchant's Quay  
Dublin 8**

**Tel: +353 (0)1 899 4020  
Fax: +353 (0)1 899 4021  
<http://www.wspgroup.com>**

---

# A National Transport Model for Ireland



*In 2010 a group of government organisations joined forces to commission a study into the feasibility of developing a multi-modal national transport model for Ireland. A model of this scale offers the prospect of forecasting the long term demand for travel across all modes and the associated impact on transport systems and the environment. It also presents the possibility of examining the effectiveness of a wide variety of national policy choices - in terms of mitigating the impacts on congestion, the economy and the travelling public – and most particularly in helping the Government to meet its national commitment to reduce greenhouse gas emissions. The recently reported study demonstrates the feasibility and benefits of developing a national model of transport for Ireland and identifies a way of taking the development forward. Some of the key findings are presented below.*

## THE BENEFITS OF A NATIONAL TRANSPORT MODEL

A national scale transport model (NTM) offers many benefits that cannot be found through alternative approaches, for example by combining the outputs of sub-national models based on different assumptions and datasets or by extrapolation of past trends which will not properly reflect current and future changes in traveller behaviour. The availability of a comprehensive model set within a consistent development framework, makes it possible to understand – and hence potentially to manipulate - the complex relationships between policy, the drivers of demand for passenger and freight travel and traveller behaviour. The basic relationships are illustrated by the figure below: The state of the economy influences overall levels of activity, while the relative locations of homes, jobs, schools, ports and distribution centres - *and the accessibility between them* - affects the choice of mode and patterns of travel.



Many European countries, including most of those in northern Europe have developed national transport models over the past 20 years. In some cases these have been linked to sub-national models, maximising the value to be gained through the use of common

data sources and providing a consistent basis for policy development. In others, the models have been used extensively to examine cross-cutting issues and to inform the development of national strategy for roll-out at regional and local levels, adding value at an early stage by stimulating cross-government dialogue.

The overall value of the associated investment in national transport models is reflected in their established and on-going use as a source of evidence to support the development of national policy as shown in the Table below for a selection of national models in continual use. Still further weight is added to their importance by the continuing cycle of updates and enhancements that have been pursued in countries such as the Netherlands, Sweden, Denmark and Great Britain where their use has been central to the development of closer integration with physical and environmental planning and of new approaches to transport pricing policy.

**Range of policy applications based on a sample of existing NTMs**

<b>National Transport Model</b>	<b>Key Areas of Policy Development</b>	<b>Year(s) first developed</b>
Great Britain	Congestion targets; Impacts of taxation (fuel duty); Road Pricing and equity issues, Introduction of Longer Semi Trailers, Transfer of road freight to rail, Vehicle Fleet changes, Emissions Targets / Carbon Trajectories	1999-2001
Netherlands	Transport Structure Plan; National road and rail planning – related to infrastructure, pricing / management and land use policy; Infrastructure planning for Zeider Zee Line; Environmental Planning in the context of Spatial Planning; Varying car costs - tolling, taxation etc.	1984-85
Sweden	National Transport Plans; National strategic investment plan (road/rail); Environmental Pricing; Accessibility studies; Assessment of Congestion Charging for Gothenburg; Regional Development plans; Use of the model by Transport operators - focused on short term, business financial issues; Municipalities' general plans - focus on urban environment impacts and accessibility;	Early 1980s
Scotland	National Transport Strategy; Tolloed Bridges Review; Forth Replacement Crossing; European Noise Directive; Edinburgh Air Quality; Support to Planning Reform; Glasgow City Plan; Lothian Development Plan; Effects and interactions of major inter urban road and public transport schemes; Traffic forecasts for Trunk Roads; Consistent information for local models	2001 as an extension to existing Central Scotland Transport Model

Although investment in national modelling tools has been substantial, the overall costs are small in relation to the costs associated with the implementation of policies and schemes that have been justified with their support. In particular, modelling costs are dwarfed by the costs that have been avoided through discarding those policies that the models have demonstrated to be unsuitable.



---

## STAKEHOLDER REQUIREMENTS

As part of our feasibility study we consulted stakeholders in government agencies, local authorities and academia about their expectations of a national transport model.



There was universal support for full modal coverage – especially for modes likely to be a focus for attention in the future including public transport, heavy goods and light commercial vehicles, air and slow modes. Most stakeholders also felt that the NTM should be capable of modelling interactions with other countries, particularly Northern Ireland and other parts of Europe.

Amongst the requirements identified, the highest ranking was for a tool capable of producing robust forecasts of transport energy use and the associated emissions, especially of greenhouse gases. There was also strong consensus that the NTM should provide a consistent basis for forecasting both freight and passenger demand and for linking these to economic growth as well as to changes in land use planning.



## POLICY TESTING CAPABILITIES

A major advantage of the NTM is that it will facilitate the comparison of a wide spectrum of policy options on a consistent basis. This includes investment projects, control or regulation policies, subsidies and pricing or taxation policies, soft and complementary measures. This flexibility will avoid the problems associated with applying different approaches or different assessment criteria to the evaluation of policy proposals.

## NTM: POLICY TESTING CAPABILITY

Investment	Regulatory	Fiscal	Other
Improvements to national highway and rail networks – improvements to speeds, capacity, new strategic tunnels and bridges	Changes in planning policy affecting eg the relative disposition of homes and workplaces, development densities, zoning of land uses	Road / environmental pricing,  Workplace charging  Tolls for bridges and tunnels	Soft Measures  Telecommuting  Green Travel Plans
High Quality Public Transport Schemes	Changes in environmental policy eg changes in the car fleet, Low Emissions Zones - urban area lorry bans	Government vs developer financing of infrastructure  Employment taxes to subsidise urban transport	Low Carbon Footprints,
New ports and airport infrastructure	Public Transport Priority Schemes eg bus routes  Transit Oriented Development	Public Transport fares policies	Sector-led carbon management plans
Freight terminals and major distribution facilities	Changes in regeneration policy eg urban area business location incentives	Fuel duty	Carbon Trading

Once the model is operational it can be run and re-run many times for a given future year, making changes to the inputs to reflect changes in policy. Sets of results can then be compared in order to evaluate the impact of alternative measures. Individual measures can be combined based on their complementarity in order to build a preferred future strategy.



---

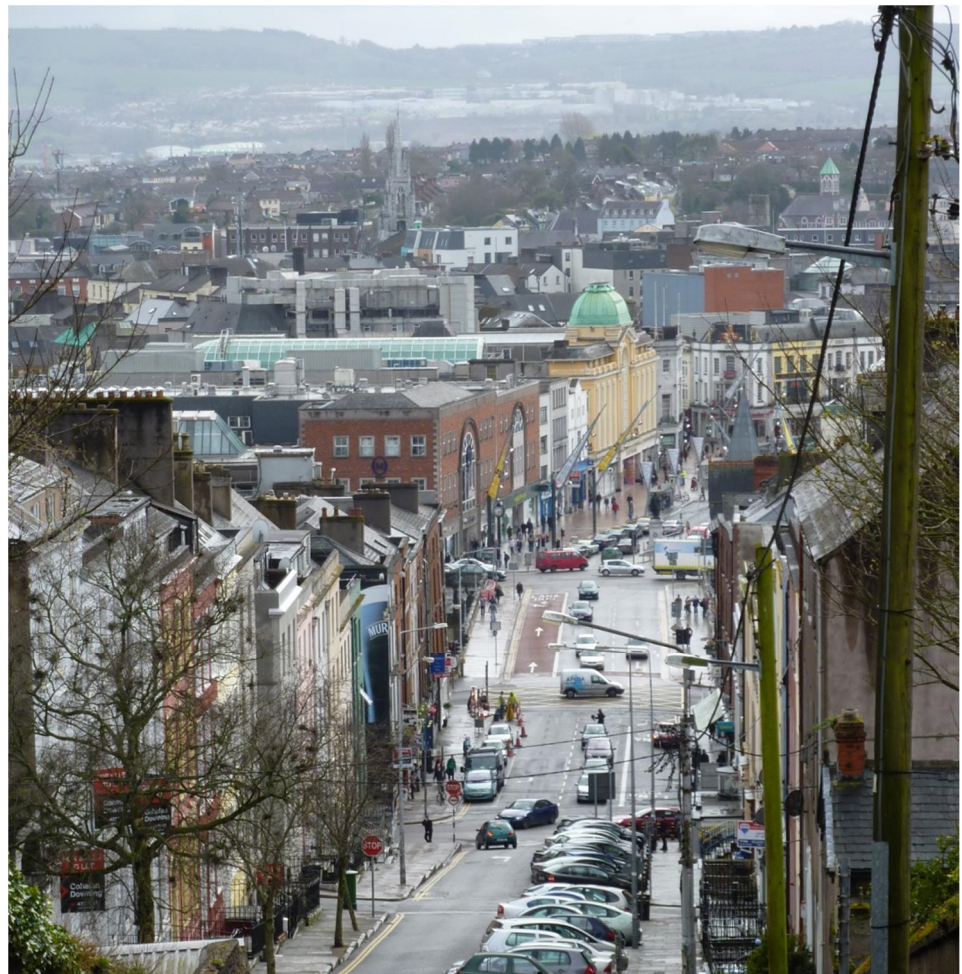
A large amount of information will be produced by running the NTM. This can be combined into indicators or presented in the form of maps or charts. Some key outputs include:

#### KEY NTM OUTPUTS

Volume of travel by area, mode and demographic profile
Movement of goods by location, mode/vehicle type and commodity
Trips to / from areas by purpose (commuting, school, business, leisure)
Average trip lengths and travel times by mode
Network flows on highways and public transport corridors
Congestion and accessibility plots
Transport emissions and energy consumption
Distribution of accidents
Economic and social impacts
Transport costs and times facing freight shippers

#### WHO WILL BE ABLE TO USE THE MODEL?

The operational model will be licensed for use by government departments and agencies, transport operators and private sector organisations with results disseminated for information to the profession at large and for input to regional and local studies.





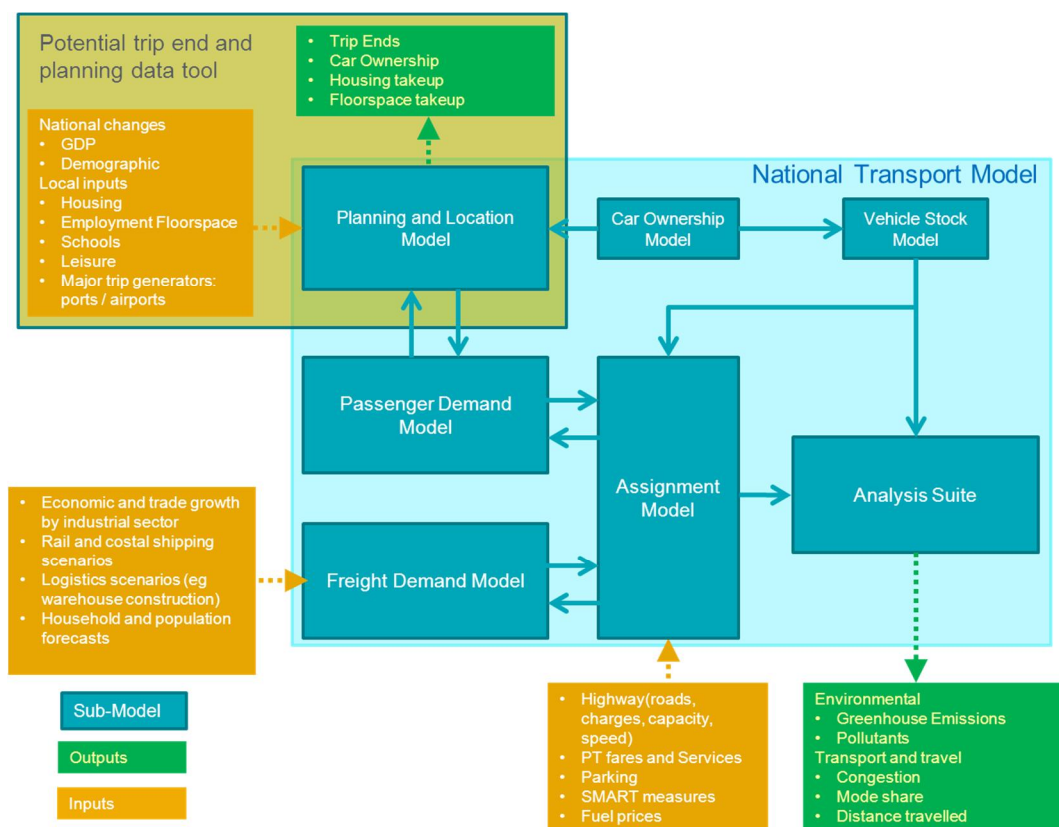
## FEASIBILITY

Embarking on a national development of this scale can be a daunting task requiring a substantial commitment of resources to data collection and development. We have estimated that the development costs for an initial version of the NTM would be up to 1.25 million euros. Further up front financial investment would also be required to secure the identified additional data. More than ever it is vital to demonstrate that investment of this scale would deliver a useful tool and provide an evidence base for developing policy. One of the questions addressed by our feasibility study therefore was *“How can we build an NTM?”*

To help answer this question, there is a wealth of experience to draw from other countries – both in terms of lessons to be learned and best practice to be distilled. Our review of this experience is very positive in terms of the future for an Irish NTM. In particular, experience elsewhere has shown that in smaller countries, issues of scale are reduced so that data collection and development timescales are much more manageable. Moreover, in the case of Ireland much of the information required to build the model already exists or could be collected with relative ease and without major cost.

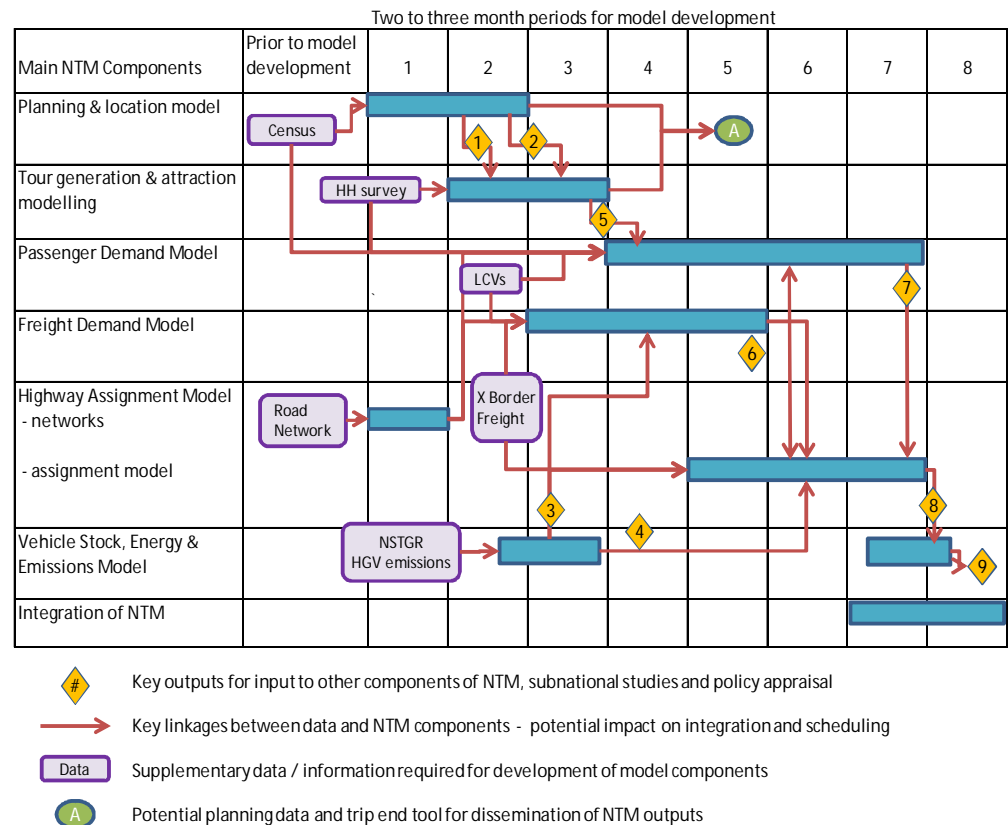
Our study also pointed to other keys to successful development. These include up-front investment in a carefully considered specification and in a modular design that provides the flexibility to underpin a carefully sequenced development programme without incurring additional costs as a result of phased implementation. Most successful models have started from relatively modest beginnings, with an initial development phase leading to an operational deliverable in no more than two years. The big advantage of this approach is that once value is proven, the operational model can attract further development funding.

With this in mind our feasibility study has developed an initial design in the form of a basic operational structure with data inputs and outputs guided by the views of stakeholders as shown in the figure below.





A Road Map sets out a development path for an initial version, followed by medium and longer term updates once the value of the model has been established. Much of the data required for the NTM can provide useful insights in its own right, and the development of the NTM should look to maximise the information that can be extracted at an early stage from the input datasets and preliminary results. The indicative programme shown below indicates from the purple boxes when the new data collected is required to feed into the components of the NTM and from the diamonds the timing of other interim outputs of value during the development phase, which would be expected to last 18 months to two years.



In addition to a number of important technical considerations, the other common factor in the success of the national models that we reviewed is a long term commitment from the owners and stakeholders. This ensures the necessary input to promote the use of the model and most importantly to maintain its on-going value to users by keeping it up to date.

## THE WAY FORWARD

To progress the development of the proposed NTM, it will be important to put in place the arrangements for additional data collection as soon as practical. Ideally new data collection would be carried out in 2011 or early in 2012 to maximise consistency with the 2011 Census. The most important new data required is an expanded household interview survey to link travel diary information to the characteristics of the population – retired people have different demands and needs for transport than families or young professionals. The other area where supplementary data is greatly needed is for freight movements, in particular: data on light commercial vehicle movements and supplementary information on heavy goods vehicles' fuel consumption.

The next important step will be deciding on the approach for managing the development of the model. A modular approach provides additional flexibility but requires careful management to ensure the components interface seamlessly to provide an efficient tool. The phasing and contracting arrangements for the development can then be put in place ensuring that interim deliverables are clearly defined.

---

#### CLIENT GROUP

Environmental Protection Agency (EPA) – Eimear Cotter, Gemma O'Reilly

Department of Transport (DoT) – Clare Finnegan, Ken Jordan

National Transport Authority (NTA) – Frank McCabe, Barry Colleary

#### CONSULTANTS

WSP Ireland: Merchant's House, 27-30 Merchant's Quay, Dublin 8.

WSP UK: 66-68 Hills Road, Cambridge, CB2 1LA