



**An Roinn Iompair
Turasóireachta agus Spóirt**

**Department of Transport,
Tourism and Sport**

**Investing In Our Transport Future: A Strategic Framework
for Investment in Land Transport**

Background Paper Fourteen

Demand Management Discussion Paper

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STRATEGIC INVESTMENT IN LAND SIDE TRANSPORT

Information Note on Demand Side Initiatives

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Contents

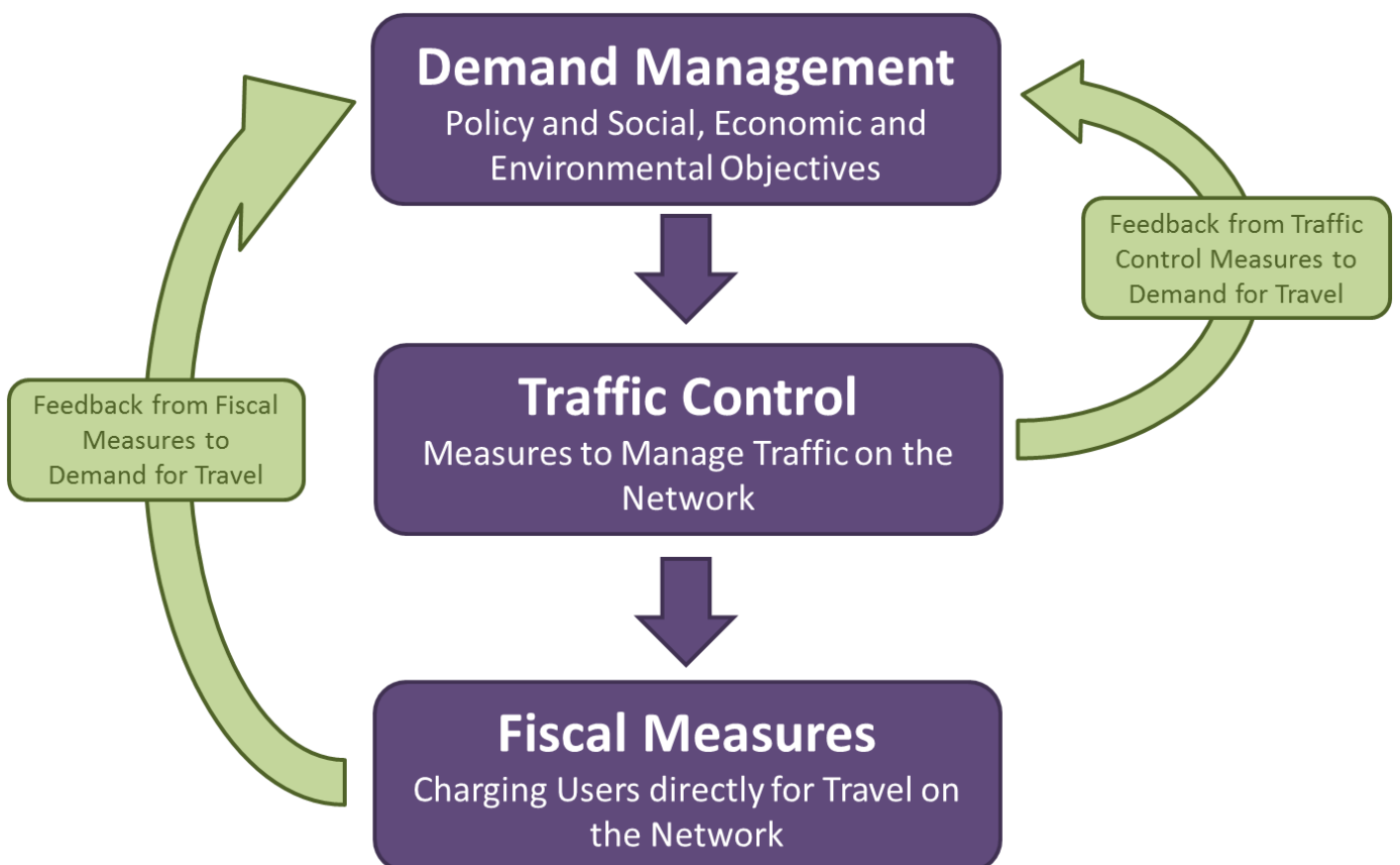
1	Introduction	4
2	Demand Management	7
2.1	Spatial Planning.....	7
2.2	Transport Provision.....	8
2.3	Car Parking	9
2.4	Promotional Measures.....	10
3	Transport Control Measures	13
3.1	Intelligent Transport	13
3.2	Capacity Enhancement	14
3.3	Priority Measures.....	15
3.4	Information Sources.....	15
3.5	National and Local Control Centres	15
4	Fiscal Measures	16
4.1	Taxation.....	16
4.2	Destination Parking Charges	16
4.3	Road User Charging.....	17
4.4	Pricing of Alternative Modes	18
5	Summary	19
5.1	Applicability.....	19

Introduction

Demand side measures are designed to achieve defined economic, social and environmental objectives in the movement of people or goods. Generally this entails maximising the efficient use of the existing transport network to minimise the requirement for new transport infrastructure investment, actively facilitating the shift towards more environmentally friendly transport modes and seeking to encourage the use of transport modes which support wider economic and social objectives. They generally aim to achieve the following:

- Reduction in the need to travel;
- Reduction in fuel consumption and emissions;
- Optimisation of capacity for goods transport and business services;
- Prioritisation of road space for public transport; and
- Improved information for road users.

The diagram below outlines the demand side of the transport system and the various groups or categories of demand side measures that could be applied as part of this framework. These range from the fundamental determinant – where people live and work – right down to measures like tolling. The system is iterative in that the decision at the outset – whether or not to travel and by what mode – may be influenced by features of the network and the costs of the journey.



The demand side toolkit can therefore be summarised as follows:

1. Demand Management
 - a. Spatial Planning
 - i. Integration of Planning and Transport
 - ii. Consolidation of Development
 - iii. Mixed-Use Development
 - b. Transport Provision
 - i. Public Transport Services
 - ii. Walking and Cycling
 - iii. Phasing of Development
 - c. Car Parking
 - i. Private car parking restraint
 - ii. Public car parking
 - iii. Parking Development Levy
 - d. Promotion
 - i. Workplaces
 - ii. Schools
 - iii. Communities
2. Transport Control Measures
 - a. Intelligent Transport Technologies
 - i. Ramp Metering
 - ii. Variable Speed Limits
 - iii. Incident Detection
 - b. Capacity Enhancements
 - i. Hard Shoulder Running
 - ii. Reversible Traffic Lanes
 - c. Priority
 - i. Dedicated Lanes
 - d. Information Provision
 - e. Network Control Centres
3. Fiscal Measures
 - a. Taxation
 - i. Fuel
 - ii. VRT
 - iii. Environmental Taxes
 - b. Destination Parking Charges

- c. Road User Charging
 - i. Point Tolls
 - ii. Distance Based Charging
 - iii. Cordon Charging
 - iv. Congestion Pricing
- d. Pricing of Alternative Modes

The remaining sections of this information note expand upon each of the above options, identifying their general applicability and some of the key issues arising in certain cases.

Demand Management

Travel demand management initiatives which influence current and future travel patterns can be broadly split into four categories:

- Spatial Planning
- Transport Provision
- Car-Parking
- Promotion

Spatial Planning

Integration of Land Use Planning and Transport

The location of services, schools and employment relative to where people live, is a critical determinant of the need to travel, travel distances and the means of travel chosen. Land use policy is a critical element in determining the long term travel patterns at a national, regional and local level. The measures proposed for implementation through the planning system are diverse and wide ranging. They aim to achieve land use and transport integration at the strategic level and local level by:

- Locating major trip-intensive land uses in areas well served by public transport or in areas that will be well served by public transport in future;
- Restricting large scale development away from built up areas and public transport;
- Relating the scale of urban centres to public transport accessibility;
- The location and provision of local services in a manner which ensures that access for the local community by walking and cycling is direct, safe and convenient; and
- Designing of all new developments with walking, cycling and public transport in mind.

Consolidation of Development

The principle of consolidation of development, based on a hierarchy of centres, is a central one in the effective management of demand for transport. This hierarchy is based on the National Spatial Strategy and Regional Planning Guidelines. Large-scale intense development needs to be consolidated into the largest urban centres – the gateways. Examples of this would include the development of Dublin and Cork Docklands. The next level in the hierarchy comprises the large suburban centres, known as Metropolitan Consolidation Towns in the Greater Dublin Area, such as Tallaght and Swords. These locations are suitable for development of retail, office and other leisure uses alongside medium-high density residential development.

Beyond these two location-types, transport also requires that the footprint of urban areas is contained insofar as is possible and that any greenfield development occurs at high-quality existing or planned public transport stops, e.g. Adamstown, Carrigtwohill. These developments need to be of sufficient density to support public transport by placing sufficient populations within walking distance of the public transport facility.

Mixed Use Development

By placing uses such as schools, retail and leisure within residential developments, the need to travel by mechanised modes is reduced or removed. The construction of large housing estates with no services has achieved the exact opposite with long car trips for the most basic purposes, such as local shopping, the norm in many parts of the country.

In inner-suburban or city/town centre brownfield sites, the mix of medium to high density residential development such as terraced housing, duplexes and apartments, with offices, retail, leisure, schools, 3rd level education etc. also reduces the need to travel for many purposes.

Transport Provision

Public Transport Services

Demand management, in terms of reducing the need for the use of the private car, seeks the use of alternative modes. It is essential that, as part of this, public transport is provided in an effective manner which competes with the car in terms of reliability, comfort, convenience and journey time. This includes a vast range of measures elaborated upon elsewhere in the framework including bus priority, real-time information, on-board Wi-Fi, high-quality shelters, integrated ticketing, etc.

Walking and Cycling

In much the same manner as public transport, the walking and cycling networks must be provided if a modal shift away from the private car is to be achieved. In the case of cycling, if the objective is to get today's car drivers to cycle in the future, it is essential that policy in relation to the hierarchy of measures, as set out in the National Cycle Policy Framework, is implemented. As part of this, there is a need to make our towns and cities more amenable to cycling by lessening the impact of traffic and by implementing safe cycling networks which link people's places of residence to the main attractors such as workplaces and schools.

In the case of walking, while most measures related to lessening the impact of traffic on cyclists have benefits for pedestrians, there are a number of other interventions such as wider footpaths, longer green-man times on crossings and all-pedestrian phases on crossroads which would help promote walking. It should be borne in mind that almost all public transport users, as well as the majority of motorists and cyclists for many leisure trips, would begin and finish their journeys on foot.

Phasing of Development

When development is being carried out, either in a greenfield suburban area like Clongriffin, or in a less peripheral location such as Pelletstown or Grangegorman, it is important that it is phased in line with the provision of public transport. Failing to do so will lead to unsustainable travel habits forming at the outset, which will be difficult to change once entrenched. For example if a suburban location develops a few years in advance of a tram line becoming operational, the residents will drive to work. They will then be more reluctant to use the tram service when it does open.

Car Parking

The supply and management of parking is central to the management of transport demand and is of particular importance in influencing mode choice for trip-attracting uses such as office, industrial, retail, leisure and institutional uses. This measure is critical for reducing vehicle usage, increasing vehicle occupancy and increasing travel by alternative modes for all journey purposes. It also has an influence on congestion, the design and cost of new developments and the allocation and design of space in urban areas. Parking measures are categorised under the following headings:

1. Private Car Parking Restraint;
2. Public Car Parking Policy; and
3. Parking Development Levies.

Private Car Parking Restraint

The application of maximum car parking standards is a key method for restricting future travel demand by private motorised vehicle. This is achieved through the planning system by placing a restriction on the amount of private car parking spaces that can be provided in a new development.

The level at which maximum standards are set is critical and are usually applied with varying degrees of constraint, on the basis of defined location factors such as centrality (town centre location) and public transport accessibility (taking into account proximity and levels of service). Related to these attributes, the application of parking standards would normally vary inversely with density. It is important that the standards are applied consistently to avoid development of trip intensive uses away from public transport investment.

While maximum car parking standards generally apply to future development, there is a legacy of existing car parking provision that could be examined to influence current and future travel patterns. This is considerably more difficult to influence as travel patterns are ingrained and there would be resistance to the removal of car parking. Also, much of the existing stock of car parking cannot be used for any other purpose other than car parking. However, there are situations where car parking can be reduced over time, such as the removal of temporary car parking and redevelopment of existing car parking.

Public Car Parking Policy

An approach that caps car parking for particular areas could be considered where the highest density of development occurs. This is aimed at controlling congestion, enabling higher development densities, and facilitating access by non-car modes. The use of such a measure would be considered at major trip attractors such as third level institutions, airports and other such developments. The idea has significant benefits for urban design, largely because it would consolidate parking rather than requiring each establishment to provide a separate car park. Further, because different land uses require parking during different times of the day, a smaller amount of parking can be shared among several establishments.

The management of off-street and on-street car parking at destinations can incentivise necessary travel behaviours and promote travel in off peak periods. For example, replacing long term car parking with shorter term car parking in central areas ensures that peak period vehicle travel is reduced, spreading the use of the road network over a longer period of time.

Parking Development Levy

At the planning application stage of development, local authorities could charge a levy on each parking space as a development contribution. This could be justified as a levy against the maintenance and upkeep of the road network. Such a levy would require to be part of a development contribution scheme adopted by a local authority.

Dedicated Car Sharer Spaces

The allocation of dedicated parking spaces in prime locations for car sharers only facilitates two or more people using one vehicle to commute. This would involve the setting-aside of spaces closest to the entrance to a workplace, for example, and a guarantee that they would always be available. It is an effective way to encourage people to car share, the impact of which is the reduction of the overall volume of cars on the road.

Promotional Measures

This section focuses on promotional measures that can impact on travel patterns. Broadly, these measures are non-compulsory and seek to encourage people to make more sustainable mode choices. This can be achieved by marketing, financial incentives, better facilities or highlighting choices available. There are three main areas within which promotional measures are implemented, namely:

- Workplaces and College Campuses;
- Schools; and
- Communities.

Workplaces and College Campuses

Workplace Travel Plans contain a package of measures aimed at supporting sustainable travel for a range of journey purposes. It comprises actions to promote walking, cycling, public transport, car sharing, the use of technology instead of travel etc. There a number of variants of the localised travel plan. These can incorporate the following measures:

- Establishing a carsharing system;
- Priority carsharing parking spaces;
- Promoting public transport through provision of tickets or facilitating public transport taxsaver ticket scheme;
- Providing shuttle services to nearby rail or bus services;
- Implementing the Cycle to Work Scheme;
- Providing pool bikes;
- Providing public rental bike cards;
- Walking and Cycling challenges;
- Putting in secure and sheltered cycle parking, shower facilities and lockers for cyclists;
- Promotion of teleworking; and
- Promotion of teleconferencing to reduce the need for travel to business meetings.

The National Transport Authority operates the Smarter Travel Workplaces programme on behalf of the Department of Transport, Tourism and Sport, supporting large employers to encourage more sustainable commuting and travel choices amongst their staff.

There are a number of initiatives within the Smarter Travel Workplace programme. Most important among these are the nationwide annual Pedometer Challenge and Cycle Challenge. These run for one month each within the partner organisations with prizes and events based around these modes for the duration of the challenges. The Authority also runs a car sharing scheme as part of this programme, for all employees nationally.

Results from before and after surveys in late 2011 from a sample of 14 participant organisations, which have implemented elements of a workplace travel plan, show:

- 10 of the 14 organisations (71%) achieved a reduction in car driver trips;
- The average reduction in car driver trips was 18%;
- 3 organisations achieved more than a 30% reduction in car driver trips; and
- Cycling increased in all but one organisation, and the average increase was 101%, with some organisations having a 3 or 4 fold increase in the percentage of cyclists.

There were some high performers, with one organisation achieving a reduction in car driver trips of over 46%. A typical plan achieved reductions in the range of 10–30%.

This programme is in the process of being extended to third-level students. While several colleges and universities are already partners, the focus to date has been on staff travel. This is now shifting towards the ways in which students themselves commute to college.

Schools

The Green Schools Travel module comprises a number of promotional measures, aimed at encouraging walking, cycling, public transport, park & stride and car sharing as alternatives to single occupancy car travel. These include the following:

- Walk on Wednesday;
- Cycle on Wednesday;
- The Walking Bus where a large group of children walk to school accompanied by adults;
- Walkability audits of the school environs;
- Cycle Training;
- Provision of secure and sheltered Cycle Parking;
- Park & Stride, where children are driven to a location off-site and then walk the rest of the way. This is often implemented in conjunction with a neighbouring facility such as a church or a supermarket where capacity exists at school hours; and
- Art and Poetry competitions based on transport.

Recent surveys of over 10,000 pupils reveal a 27% drop in car use and a correspondingly significant increase in numbers of pupils walking and cycling to school.

Communities

Residential Travel Planning is an approach to delivering targeted information directly to people to help them make sustainable travel choices. The key objective is to increase the proportion of journeys to be made by walking, cycling and public transport. To date the Authority has been

involved in two such projects. A pilot Personalised Travel Plan scheme was undertaken in Adamstown, South Dublin in 2009 and another was completed in neighbouring Lucan and Clondalkin in 2013.

The measures carried out were similar in nature to those in schools and workplaces, and include the following:

- Personalised Travel Planning, where a team of people knock on doors in the study area and discuss travel options face-to-face with people;
- Group Walks and Cycles with members of the community, e.g. along the Grand Canal cycleway;
- Youth group excursion by bus and train; and
- Free public transport tickets.

The Adamstown pilot showed a shift in travel behaviour, with significant numbers switching to walking or using the bus. 59% of respondents reported increased use of sustainable modes, with 41% of respondents reporting a reduction in car usage during the pilot.

In Lucan and Clondalkin 51% of respondents to the Personalised Travel Planning Aftercare Survey indicated that they changed their travel behaviour as a result of the door step engagement, with 34% indicating that they walk more and 17.5% indicating that they cycled more. The Travel to School Surveys show a 10% reduction in private car drop off overall with modal shift to walking, cycling and park and stride evident. Outputs from the Dublin Bus transactions database show increases in patronage at the post engagement stage, of between 1% and 19%.

Transport Control Measures

Once the Demand Management measures have been implemented and the level of car use has been minimised at a broad policy level, transport control or regulatory measures are generally required to address issues arising from excess demand for road space on individual road corridors. As illustrated in the diagram above, the relationship between transport control and demand management is an iterative one and it is anticipated that the measures outlined in this section would suppress demand in certain cases by encouraging a modal shift. The objectives of such measures are to:

- Improve safety through managing traffic flow on high capacity roads;
- Improve travel time reliability through areas prone to congestion;
- Improve journey times by reducing traffic flow instability and making best use of existing roadspace;
- Providing reduced journey times or improved reliability for dedicated vehicle types (e.g. public transport vehicles, freight or high occupancy vehicles); and
- Reduce emissions by reducing energy use in transport streams.

Traffic Control measures can be categorised as follows:

- Intelligent Transport, which uses on-road technology to influence traffic flow in response to observed behaviour. Examples include ramp metering, variable speed limits, and incident detection;
- Capacity Enhancement, which increases road capacity within the existing boundaries, but supported by a management function. The most relevant examples are Hard Shoulder Running and reversible traffic lanes;
- Priority measures, which dedicate lanes to specific user types, such as public transport, freight, or high occupancy vehicles;
- Information sources provided pre-trip or during a trip which assist users in making appropriate responses to avoid congestion; and
- Network control through the use of national and local control centres.

Traffic control measures can also be used to restrict access for certain vehicles to central urban areas and key destinations. This results in a dampening of private vehicle demand to these areas.

These types of measures can be implemented in the short-medium term. In most cases, little is required in terms of capital investment, with the focus instead on providing information through ITS and a suite of signage and on-road controls, both permanent and temporal, such as traffic lights and perhaps some form of physical lane segregation in the case of public transport, HOV or freight lanes. These measures are described in more detail below:

Intelligent Transport

Ramp Metering

Ramp Metering is the control of access onto a dual carriageway or motorway corridor, through the provision of traffic lights on the entry slip road which respond to the traffic conditions on the corridor. The purpose of Ramp Metering is to prevent or delay the onset of flow breakdown on the main carriageway, maximising throughput whilst attempting to minimise disruption. Ramp Metering minimises congestion through the use of a systematic control mechanism, as follows:

- Traffic signals positioned on the on ramp are installed such that they use control loops on the mainline carriageway to assess flow conditions. This technology is used to monitor and manage the traffic flow on the on-ramp;
- Once a pre-determined set of flow conditions are reached Ramp Metering is activated;
- The signals control the flow of additional traffic from an on ramp onto the motorway that, if left unregulated would contribute to or trigger the development of flow breakdown;
- The Ramp Metering control mechanism delivers an ordered distribution of vehicles onto the main carriageway to reduce the potential for flow breakdown; and
- The control mechanism and associated infrastructure is designed in order to reduce or avoid congestion spillback to the adjacent urban traffic network or to other national routes.

It should be noted that in the case of strategically important routes such as the M50, Ramp Metering may also have the added benefit of deterring drivers from making short trips on the motorway, increasing the attractiveness of local roads as an alternative.

The potential disadvantage of Ramp Metering is the delay to on-ramp traffic arising from the use of traffic signals. However, this delay is often offset by travel time savings once traffic has joined the mainline flow. It has been shown that Ramp Metering is not effective in periods of heavy congestion where the absolute capacity of the network has been exceeded.

Variable Speed Limits

Variable speed limits allow speed limits to be dynamically set to suit traffic conditions, so that flow is maintained, avoiding stop-start conditions that arise from driver behaviour when congestion limits speeds below the road's usual limit. Its use is growing in popularity on motorway networks as a means of improving safety and improving traffic flow conditions. Typically such technologies are used on high capacity multi-lane roads where speed differentials between adjacent lanes can lead to sudden braking and an onset of shockwaves as a result of lane changing behaviour

Incident Detection

Incident detection comprises a distributed network of traffic sensors, mainly inductive loops, which are designed to set variable message signs and advisory speed limits with little human intervention.

Capacity Enhancement

Hard Shoulder Running

Hard Shoulder Running involves the adaption of the hard shoulder for use as a traffic lane. Implementation of Hard Shoulder Running affords road authorities the opportunity to increase road capacity for significantly less capital expenditure than the more usual practice of widening to provide additional lanes.

Hard Shoulder Running schemes can be either temporary to cater for increased traffic flows during peak periods or can be permanently operational. The operation of the schemes is managed by driver

information displays mounted on overhead gantries, which display lane closures, varying speed limits, etc. A number of other measures must be put in place to allow for the operation of Hard Shoulder Running including the provision of Emergency Refuge Areas (ERAs) to cater for breakdowns and other emergencies

Reversible Traffic Lanes

Reversible Lanes allow the direction of running lanes to be reversed to provide additional running capacity in the peak direction – whether this be for dedicated vehicle types or for all traffic. Implementation would most likely require gantry signage and supporting roadside information on approach to the area.

Priority Measures

Dedicated Lanes

A further form of traffic control is achievable through the allocation of roadspace to particular vehicle types. Such measures can comprise the allocation of a single lane within the carriageway to dedicated vehicle classes (as in the case of bus lanes), or the restriction of the use of a road to nominated types of vehicle (bus, taxi and/or Luas). In the case of the Dublin Port Tunnel, roadspace is allocated to public transport and freight vehicles, with other vehicle classes permitted but through payment of a toll.

Information Sources

Roadside information

Roadside information, such as VMS, can be an effective way of warning motorists as to delays or detours and can help alleviate congestion on the network.

In-vehicle Information

The use of radio and sat-nav technology to inform drivers directly helps them make an informed choice as to their route.

National and Local Control Centres

Control centres are used across Europe, the UK and USA as a means of supporting ongoing management of transport networks. While some countries use a number of regional control centres, it may be most beneficial if a national centre was developed for Ireland. Studies have shown that significant savings can be made using by developing these centres, in terms of travel times and fuel costs.

Fiscal Measures

This section focuses on measures that introduce financial penalties or implement increased impediments to discourage certain travel patterns. These disincentive measures aim to modify travel behaviours to reduce car usage and promote the use of alternative modes. In other words, similar to traffic control measures, the relationship between fiscal measures and demand management is an iterative one, whereby the potential exists to encourage a modal shift as the costs of private car use and public transport converge.

Taxation

Taxation measures aimed at either car ownership or car usage costs can act as a form of demand management measure. Taxation measures focused on car ownership have the disadvantage of being “one off” payments that provide no subsequent disincentive to travel, whereas taxes based on car use can be more effective.

Fuel

Fuel taxation is a relatively simple device to implement, and is very effective at targeting reductions in fuel consumption and consequently CO2 emissions. However, disadvantages arise from the fact that it is an untargeted tool that affects all users equally on all routes and at all times. It lacks the ability to be area specific or to target car journeys at congested times or in places prone to congestion or where local traffic related environmental issues exist.

Motor Tax

Motor Tax is paid annually on all cars owned in the state. For those cars from 2008 and earlier, it is calculated based on engine size. Cars registered from 2008 on have their tax calculated on the basis of their emissions. The cost of motor tax may influence levels of car ownership but due to the fact that it is a flat tax unrelated to use, its efficacy as a demand management measure is questionable.

Environmental Taxation

Both fuel taxes and motor tax, if applied in a certain way, can be regarded as environmental taxes. Charging more for petrol and diesel may make alternative fuelled vehicles, such as electric cars, more attractive. Using the emissions bands for the purposes of motor tax, by charging ever more disproportionately higher rates for more-polluting vehicles may diminish their popularity, helping to achieve the environmental objective of reducing emissions. In terms of transport however, it is the reduction in the level of travel undertaken which we are most concerned with here, rather than the use of cleaner vehicles.

Destination Parking Charges

By charging for parking at destinations, such as retail centres and workplaces, the propensity to drive is lessened. This is a difficult balancing act in that often the places where demand needs to be managed are the places where policies aim to promote, such as city and town centres. These charges need to be set carefully in order that trade and activity is not pushed out to out-of-town locations where there is less pressure on parking. This is true of retail and employment.

Road User Charging

Road user charging is designed to influence people's decision to make a journey by car, and encourage them to consider alternative modes to the car when they do travel. Road use charging spans a range of possibilities from relatively simple single toll point charging to more elaborate area based or route charging schemes using satellite tracking systems or Dedicated Short Range Communication (DSRC) systems. Rates can be single fixed rates or a variable rate tolling system can be used which applies a higher toll charge during peak hours than the charge prevailing in the off-peak hours.

Cordon or area based road pricing is a levy on car usage in specified locations/times. This can consist of an area licence scheme or a cordon entry charge. It provides the most direct means of levying a user with the full external cost of the trip being undertaken and allows for the full application of the "user pays" principle. Different objectives can be targeted under a road use charging scheme, including congestion management (reducing delays for economically essential traffic), and environmental improvement.

To facilitate greater public acceptance, the imposition of road use charging can be linked to delivery of clearly defined improvements that are tangible and visible (such as improved public transport) or to a redistribution of costs (for example a reduction in public transport fares) so as to render the charging effect relatively cost neutral on an overall basis. The following methods of road user charging could be considered in Ireland.

Point Tolls

A simple road toll, i.e. a charge for using a road that charges based on the type of vehicle using the road can be designed so as to reflect the cost of construction and maintenance of a road. It is therefore a good way to charge road users for the infrastructure cost of their road use.

Road tolls of this type are less effective at recovering the environmental cost of a given piece of road use. Although the toll can increase for larger vehicles, it will not reflect the extent to which a road user has minimised the environmental impact of their road use by, for example moderating their speed or operating an efficient vehicle.

Multiple-Point Tolls

Multiple point tolling aims to capture the costs of road use in a more equitable manner than a single point toll, which only charges at one single point on the road, often used as a means of paying for that section. In this method, a number of tolling points are established along, for example, an inter-urban route and those travelling the furthest distance pay the most.

Distance Based Charging

While more expensive to operate than single toll points, a toll charge based on the distance travelled is an effective method of equating the charge payable to the portion of the infrastructure used or the journey length. This results in the user paying in a more equitable manner than a single-point toll. Distance based charging can be based on a single route or encompass a network of routes.

Cordon Charging

A cordon charge is a common approach to road user charging, whereby motorists would be required to pay in order to gain entry into a particular area, most often a city centre. This has been applied in London and a number of cities elsewhere. Drawbacks would include potential detrimental impacts on trade in the central area as access may be perceived to be better elsewhere. A blanket charge also fails to account for differing levels of congestion. The advantage is that by deterring unnecessary car traffic, particularly through traffic, the network in the area inside the cordon is capable of carrying an increased number of public transport vehicles and cyclists with greater levels of priority.

Congestion Pricing

Congestion pricing aims to charge the road user at the time and location where roadspace is in most demand and delays are most commonplace. The aim of this approach is to encourage those with choice as to when they travel, to undertake their journeys outside the main peak.

Pricing of Alternative Modes

Central to a decision on transport use by an individual is the issue of cost. The effectiveness of many of the fiscal measures mentioned in earlier sections rely upon the imposition of an additional cost for use of a particular section of infrastructure or route, or for the use of the mode generally, as in the earlier taxation section.

An alternative approach to the imposition of a cost on to one mode of travel is to decrease the cost for an alternative mode. In the case of a competing choice between public transport and journey by car, cost is one of the key components in that decision process. Rather than imposing additional cost on the car journey, the same outcome, in terms of creating a cost differential between the two modes, could be achieved by decreasing the cost of the public transport option to the individual user. However, a key disadvantage of this approach is that it would require greater subsidisation of public transport services, necessitating additional funding provision.

Summary

As can be seen from the foregoing sections, demand side initiatives span a considerable spectrum in the area of transport.

For the purposes of this paper, they have been categorised into three broad categories, each with a number of sub-categories. These are:

1. Demand Management Measures
 - a. Spatial Planning
 - b. Transport Provision
 - c. Car Parking
 - d. Promotional Measures

2. Transport Control Measures
 - a. Intelligent Transport Technologies
 - b. Capacity Enhancements
 - c. Priority
 - d. Information Provision
 - e. Network Control Centres

3. Fiscal Measures
 - a. Taxation
 - b. Destination Parking Charges
 - c. Road User Charging
 - d. Pricing of Alternative Modes

Applicability

The applicability of particular measures will be dependent upon the objectives set for the development of transport. Current policies established under the *“Smarter Travel – A Sustainable Transport Future (2009)”* requires that *“[w]ork-related commuting by car will be reduced from a current modal share of 65% to 45%”*, and that *“[t]he total kilometres travelled by the car fleet in 2020 will not increase significantly from current total car kilometres.”* Delivery of those objectives, if retained, will require a greater application of aspects of the above measures than has been the case to date in Ireland.

The actual objectives set for transport and the target dates for delivery of those objectives will be central to determining the demand side initiatives that need to be deployed. For instance, a long-term target would suggest that spatial planning type measures would have a significant role to play, allowing the development planning system to operate to assist in the achievement of the desired outcomes over the relevant period. On the other hand, if more immediate change is required, it is more likely that fiscal or control measure will be necessary to achieve the intended targets.

Overall, it would appear most likely that a mixture of initiatives will be required, sculpted in policy terms to deliver a process of change that delivers a more sustainable transport system.