Intelligent Transport Society
Public Sector Liaison Group and Road User Charging Interest Group
4th June, Cardiff, UK

Introduction

The first part of the seminar concentrated on looking at background issues to the subject of Road User Charging (RUC), with an emphasis on how to gain political and public acceptance for RUC. The second part of it considered various types of road user charging technologies and how these would fit into integrated strategies.

Charging for the use of road space has become a serious political issue and is on the agenda of many governments and city authorities around the world.

The continual decline in the cost of motoring in real terms is one of many factors contributing to a large rise in the use of the roads and hence an increase in congestion in towns and cities.

Charging for use of road space not only forces users to recognise the external costs of road use but also provides an incentive for users to consider other forms of transport. Charging can take account of a user's location and the time of travelling and hence it is a targeted approach to the problem rather than simply further increasing fuel duty in an attempt to reduce the number of journeys being made.

Intelligent Transport Systems: a combination of Information Technology and telecommunications, allowing the provision of on-line information in all areas of public and private administration. ITS improve the efficiency of transport by use of electronic systems to improve traffic control and enforcement of traffic regulations. Electronic motorway tolling and congestion charging are other ITS options.

A large proportion of the seminar attendees were business representatives, involved in the provision of communications support services to telecommunications operators amongst others. There is a potential interest for CURACAO here in terms of background experience for the Technology chapter from a number of contacts I made at the seminar. CURACAO may be able to exploit their knowledge and any research leads that they are aware of relevant to the technology side. There were also a number of representatives from The Highways Agency (which is an Executive Agency of the UK Department for Transport (DfT), and is responsible for operating, maintaining and improving the strategic road network in England on behalf of the Secretary of State for Transport) and a number of representatives from Local Authorities in Wales.

Dissemination for the project was possible through the provision of the first version of the newsletter at the event and by general networking during the intervals.

Policy Context and Options

The change in travel behaviour that results in reduced traffic levels at particular times of day is the compound effect of individual travel decisions, use of alternative modes, changing time of travel to avoid the most congested periods, route choice (to avoid the most congested parts of a road network), reducing the number of trips made.

Complementary measures also need to be considered alongside RUC. Employer-based green transport incentives (such as teleworking) and better public transport are examples of non-restraint based measures to cut congestion. In locations where the congestion problems are most acute, restraint based options are likely to be best used – however these are subject to greater barriers to implementation, notably public and political acceptability.

The charging policy also needs to define the basis of charging. There are many options here, including: point-based charging, closed charging, area pricing and entry permit schemes, cordon charging schemes, multi cordon / zone-based charging schemes, distance-based charging schemes and time-based charging schemes.

Type of charging	**Example location**	**Notes**
Area Licensing	London	Enforced at the boundary point and within the area itself
Cordon Charging	Singapore	Charge to enter but not to drive around the zone - this can create 'boundary effects'
Distance-based Charging	France / USA	Toll roads which are charged based on the distance covered
Time-based Charging	None	Charge based on the time a vehicle spends within an area

Road User Charging – Part of a Package

The economic case for Road User Charging (RUC) should be based upon the price mechanism, treating road space as a scarce resource like any other, that should be rationed. Ideally, RUC schemes should be 'revenue neutral', so that those who pay a charge are no worse off overall as a result. The argument was that this was best achieved through a reduction in other costs such as fuel duty.

The general consensus in the industry is that there is no simple or single solution to the problem of traffic congestion. A combination of measures are required to look at tackling some of its adverse impacts, be that in terms of the local economy, the environment etc. The policy of previous governments in past decades was to 'predict and provide', to invest in road widening projects where there were capacity constraints. It is widely accepted now that such a policy is unworkable as it an incredibly expensive short-term solution to the issue of congestion, and empirical evidence would suggest that road widening schemes have proved to be merely traffic inducing in the long term, causing the problem of congestion to return.

Influencing the demand for travel to smooth out peak time travel would lead to an improved position with respect to road congestion. Consider the cost of a rail ticket from Cardiff to London at £125 (€185) in the peak period (but just £25 (€37) off peak) - the same type of approach could be applied to the roads, in terms of pricing more during busy peak period times and less during the off-peak period. The UK is in an unusual position with respect to the railways, in that UK Train Operating Companies (TOCs) are actually required to pay the UK Government to operate franchises in the UK. This inevitably contributes to the high prices charged to passengers in the peak period (and peak fares are usually unregulated so the operators can charge up) to recoup part of this investment (and this works due to the low elasticity of demand in the peak period, meaning that the high peak prices are accepted by those travellers). Conversely, high rail fares in the peak do not act as an incentive to mode switch to rail away from the private car.

Road User Charging should always be looked at as part of a wide Demand Management strategy, including aspects such as parking policy and management, road capacity re-allocation and land use planning. The supply and price of parking are an integral part of the equation in terms of solving congestion. Previous studies have suggested that an offer of free parking in the city centre is a virtual 'push' to use the private car for the journey to work.

Soft Demand Management measures such as encouraging more children to travel to school in any way apart from by car and people who work in town and city centres not to travel by car can help to reduce congestion. Workplace and School Travel Plans are now helping to ensure that the maximum possible is being done to reduce car use for these types of journeys.

Acceptability Issues – How to make RUC work?

The challenge for city decision makers and politicians is how to put together a solid political package, acceptable to both politicians and to the general public.

The charging levels must be set so that a scheme is effective in meeting its objectives, and that the charge levels are seen to be fair and not disproportionate. The charge level is linked to the amount of revenue raised, and the usage of revenue is also critical to the

success of a scheme. Those who pay the charge generally want to see the revenue raised earmarked back into local schemes, either investment into the local road network or the local public transport network. Revenue use must always be transparent and clear to those paying the charge. Schemes that are designed to be 'revenue neutral' should prove to be more publicly acceptable than those that are designed to raise funds (revenue additionality) where there is no clear mechanism in place to earmark the revenues raised from RUC.

The issue of how to ensure schemes are equitable is important in light of the fact that social inclusion is generally high up on the government's policy agenda. Clearly schemes must be seen to be equitable. The classical equity case against road user charging is that it will unfairly price poor people off the road network by the imposition of a flat-rate regressive charge (of which will impact most upon poorer people), of whom may have less flexibility in the times that they need to travel (e.g. work shift patterns) and would be penalised to a greater degree, certainly under a time-based RUC system. One of the most common counter-arguments is that the poor rely less heavily on the private motor car and more on public transport - public transport normally benefits under existing or proposed RUC schemes, leading to a position where poorer communities benefit indirectly in this respect.

Improved public transport is usually an important pre-requisite to the introduction of any road pricing scheme, in order for there to be an attractive and acceptable alternative in place (the carrot) prior to the introduction of a road user charging scheme (the stick).

Solutions to traffic congestion need to be tailored to the individual city. What is right for one city may not be suitable for another. RUC is not necessarily the best or most appropriate policy option in all cases.

Privacy: The use of new networks of ANPR (Automatic Number Plate Recognition – the scheme design used for the London congestion charge) enforcement cameras imply that the total level of camera usage increases. There is a feeling from this of moving a step closer towards the 'Big Brother State'. This issue is, however, not as important to end users as other aspects of RUC implementation.

The cost of collection and administration of a RUC scheme is also an issue that needs to be considered. During the initial years of the London congestion charging scheme, the cost of administration was equivalent to 47% of the revenue collected.

There is a need to present a balanced case for road pricing – at the moment the case is being dominated by the anti-Road Pricing lobby. A key task is to promote the benefits of RUC as widely as possible and to compress the negative effects. The media appears to play a pivotal role in conditioning the public against road pricing.

Technology Options and Enforcement

The technical capacity to support any type of scheme is also crucial when considering scheme design – clearly the technology being used must be reliable and operate efficiently in order to collect and process the relevant information quickly and efficiently.

Whilst it's important to try and ensure that scheme design is kept simple there is no use in having a state-of-the-art scheme that cannot function properly due to enforcement limitations.

There are currently only three primary technologies for the measuring and recording of road usage: Dedicated Short Range Communication (DSRC), Global Navigation Satellite System (GNSS) and Automatic Number Plate Recognition System (ANPR). Each of these technologies has different capabilities and are not directly comparable but can complement each other as part of the charging and enforcement process. Here is a short summary about each of these types of technology:

Dedicated Short Range Communication (DSRC) – This scheme relies on a battery-powered transponder usually mounted on the vehicle windscreen to communicate with roadside equipment mounted on a pole or gantry. This requires ground-based infrastructure for charging. It is a proven technology which is applicable to both toll plazas and open road free flow communications.

Global Navigation Satellite Systems (GNSS) - A GNSS-based solutions uses an on-board unit (OBU) which combines a GNSS location system and a communications link (usually a cellular radio network) with a digital map either on-board or in the 'back office'. The OBU measures the vehicle's position which is used to identify the road segment to enable the correct charge to be assessed.

Automatic Number Plate Recognition System (ANPR) – ANPR depends on the capture of images of a vehicle that contains its number plate to automate the enforcement process for vehicles by identifying those that have not completed the required actions (e.g. the payment of a charge) by a set deadline.

Regardless of the type of technology chosen for charging to enable a charging policy to function, relevant infrastructure will always be required. There are three main areas which may be enforced or controlled depending on the nature of the scheme; non-payment of fees, non-compliance with permissions or local regulations and mismatch between declared and measured vehicle parameters.

The capturing of evidence of a vehicle's identification and presence in the charging area at a prescribed time is a primary requirement of any charging scheme that does not rely on any type of physical enforcement such as barriers. In the UK the evidence collected is generally image-based. Information extracted either automatically (e.g. by ANPR) or manually from a still image of a vehicle can help automate the enforcement process but this is unlikely to be regarded as primary evidence in court.

Present Situation

It is the view of the Intelligent Transport Society (ITS) that in the UK, the key technologies for charging and enforcement that could contribute to National Road Pricing are already commercially available.