



Policy Packages as potential routes to urban road pricing in the UK

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Abstract

This paper focuses on urban road pricing as a demand management policy that is often regarded as radical and generally unacceptable. Road pricing often gets delayed or abandoned due to low acceptability. This may be due to the fact that complex interactions and drivers of change affect road transport management and require cooperation within implementation networks. The implementation network is a group of people (referred to as partners and actors) who co-ordinate the introduction of policy tools. The drivers of change include any internal or external influences that have an effect on the time, place, or 'shape' of the policy measures being introduced.

Demand management measures that focus on 'sustainable transport' usually address a limited set of objectives and are often implemented alone i.e. are not necessarily combined with other policy measures. When combined with other measures, it is not always clear whether the multiple interactions between policy tools and implementation networks have been sufficiently considered. Examples of ongoing implementation of policy package in the UK are the support of road pricing initiatives combined with public transport improvements by the Transport Innovation Fund.

The objectives of the paper are twofold. First, we present a review of the UK urban road pricing situation. Second, we contrast the emerging issues against six key implementation factors. The analysis of three existing UK road pricing examples - London, Edinburgh and Durham – shows the importance of combining policy tools. Furthermore, through the above examples and theoretical arguments, we emphasise the additional need of creating and maintaining strong networks when implementing policy packages.

Keywords: Urban Road Pricing; National Road Pricing; Transport Innovation Fund; Transport Policy; Policy Packages.

1. Introduction - A need for change

It has been said often, but apparently not often enough, that “*in transport things cannot go on as they have before*” (Glaister, 2001; Docherty and Shaw, 2003). A move

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from the 'predict and provide' transport policy to a demand-management, multi-modal, environmentally and socially sustainable approach was never expected to be easy. Many people don't like the idea of having to change. But with environmental pressures building and economic impacts of congestion worsening the society in general might be forced to change.

Transport is already a large component of our economy and society - this can be seen in the relationship of transport with GDP. In the UK context this has been illustrated recently in the Eddington report (Eddington, 2006). Combined developments in technology and the world economy have accelerated change to almost unpredictable levels. The change affects many areas and transport is not an exception. With new vehicle technologies, radical policies and the persistent growth in private and commercial vehicles, a new changing transport landscape is emerging. The UK, together with most European countries, is transport intensive and dependent, and the trends are for further growth. The current UK government has made many steps in "rejecting the myth of the great car economy" (Docherty and Shaw, 2003) but the performance of their policies has been ambiguous. Car use continues to grow, car-reducing policies such as road pricing as well as alternative travel modes are not promoted adequately, and large-scale road building projects are slowly appearing again. This is not a viable model for the 21st century.

The car has evolved from an expensive luxury for a few to become an important tool for the everyday lives and employment of the majority of people, a status symbol and a hobby. Increased use of private vehicles has not only brought benefits. For many years congestion was little more than a localised problem. Today it has become endemic, not just for major cities but even in many rural regions. Associated with traffic congestion, are the related problems of air pollution, emissions of CO₂ and other greenhouse gases, together with more subtle lifestyle effects, such as contributing to less healthy lifestyles and transport poverty (Ieromonachou *et al.*, 2006b). Some academics have reported thoroughly the unsustainability of current transport practices (Banister, 2004; Whitelegg, 1993).

The topic of merging policy measures into policy packages has been previously addressed (May *et al.*, 2005; Verhoef *et al.*, 2008). Conclusions from many studies (CORDIS, 1999; DfT, 2004a; Feitelson *et al.*, 2001; Wall *et al.*, 2008) have supported the idea of implementing policy packages. Cases where this was seen as necessary include projects that generated tradeoffs by attempting to reduce externalities of other transport systems. For example, a set of restraint measures in a city centre could result in higher concentration of traffic in surrounding roads. A set of policies that includes different measures could have one measure addressing the negative impacts of another measure. For example, improvement in public transport systems in a city centre could help reduce the impact that access control or pricing policies would have on car drivers.

The purpose of this paper is to explore the potential in successfully introducing sustainable development with the combination of policies into packages (policies reinforcing one another) and network dynamics (interactions, motivation, and learning). Whether it is termed as policy packages or integrated strategies, this study does not make a distinction. May *et al.* (2005) strategically exemplified integration in five different ways. The examples presented here are categorised as integration between policy instruments involving infrastructure provision, management, information, and pricing. To illustrate this, UK road pricing cases are reviewed including London, Durham and Edinburgh. A recent action by the UK government was the creation of the Transport Innovation Fund (DfT, 2004b; 2005) to support experiments with a package

of policies including road pricing. Apart from examples on the implementation of schemes in the UK, the Transport Innovation Fund (TIF) - as an approach for combining policies into packages - is discussed.

The paper will now summarise recent transport policy in the UK (Section 2) followed by a detailed description of the three road pricing cases (Section 3). Section 4 considers the Transport Innovation Funding and how it relates to policy packages. Section 5 examines the key issues observed within each implementation factor. Sections 6 and 7 summarise key learning outcomes and potential ways forward for future applications.

2. Recent UK Transport Policy

To understand the reasons responsible for the introduction of road pricing schemes in Britain and the subsequent 'stalemate' that has been reached, a brief overview of recent transport policy issues is necessary.

The current Government, after the success in the 1997 general election, published the consultation document *'Developing an Integrated Transport Policy'* that had little impact as it basically reiterated the goals set by the previous administration. This was followed by the 1998 White Paper (DETR, 1998a) which was the first transport White Paper in 20 years. This document *"influenced policy and research and geared them towards the idea of an integrated transport system"* (Hine and Preston, 2003). Policy moved towards reducing car use and increasing alternatives, including public transport, cycling and walking.

New powers were proposed for local authorities to improve public transport services and encourage more sustainable modes of travel. The Greater London Authority Act and Transport Act (TSO, 1999; 2000) enacted the White Paper proposals, including provision for road user charging (RUC) and work-place parking levy (WPPL) schemes to be introduced by local authorities. Road user charging could have a role to play in reducing overall demand and the Royal Commission on Environmental Pollution (RCEP) concluded since 1994 (and also in 1997) that RUC could help reduce the dominance of motor traffic if local authorities were given powers to introduce RUC in their own areas.

A fundamental shift in transport policy was pledged in the pre-election campaign of 1997. But the problem is that the UK government backed out too easily from its original promises, as many academics agree (Docherty, 2003; Goodwin, 2003; Potter, 2001), and that it has fallen well short of the integrated transport aspirations expressed in the 1998 White Paper even by the time the 10 year Plan was issued in 2000. Soon after the publication of the Transport Act 2000, fuel protests in September caused the removal of the fuel duty escalator, an important part of UK transport policy until then. *"All attempts to rebalance the cost of car use and public transport - a policy of successive Conservative and Labour governments for ten years - ceased from that point on"* (Potter, 2004). The first instalment of 'Transport 2010: The 10-Year Plan for Transport', started the shift of the policy back to road construction, with around £60 billion allocated to roads over 10 years. The 'second' 10-Year Plan came in 2002 when the government published a progress report on the 10 Year Transport Plan. In this report it was admitted that congestion-cutting targets set out in the first plan were not going to be reached. Unforeseen economic growth and an unwillingness of local governments to implement congestion charging schemes were blamed for the failure to stay on target.

The 2004 White Paper on Transport, ‘The Future of Transport: A Network for 2030’, appeared as supporting a national road pricing scheme but did not set any firm time limits or reassurances about the technological feasibility of such a scheme. A national scheme was ‘reassuringly’ set aside for the next 15 years, therefore removing it from a current political focus. However, at the same time as the White Paper was being published, another document emerged which constituted a comprehensive study on road pricing and how it could help make better use of the road capacity. The Road Pricing Feasibility Study (DfT, 2004a) explained the reason for the time scale of the national road pricing scheme as being the need to develop the appropriate technology which was not expected to be available until at least 2014. Moreover, in its chapter six the report suggested that undertaking forms of road pricing on a more limited scale would improve knowledge on the effects and benefits of pricing. Support for these local schemes could come from the Transport Innovation Fund (TIF) which was outlined in the (TIF) report (DfT, 2005). The TIF offered support for packages which combine demand management (including radical schemes like road pricing) with measures to promote modal shift and better bus services - the initial TIF funds would be made available from 2008/9.

3. Road Pricing in the UK

Road pricing was recognised some time ago (see for example Ison, 2004) as a way for taxing the external costs of transportation – congestion, accident risks, noise and emissions of pollutants (Maddison *et al.*, 1996). With the exception of the Singapore scheme (1975), it was not until two decades later that politicians started to recognise road pricing as a potential funding source and travel demand management measure. Examples include the Norwegian urban toll schemes of the mid-eighties and early nineties, the Italian city centre pricing trials that evolved from zone access control and the two road user charging schemes that came into operation in Britain.

Road user charging had been proposed in the UK several times since the Smeed report (delivered in 1964), but there were no serious attempts to practically introduce the policy, with the exception of a trial in the city of Cambridge in the early 1990s. For a number of reasons, most notably the lack of political support and not least because of the proposed “congestion” technology, the Cambridge scheme failed to progress beyond the field trial (Ison, 2004). Legislation for road pricing measures in the UK has been encouraged in recent years through the Transport White paper ‘A New Deal for Transport: Better for Everyone’ (DETR, 1998a) and the following daughter document – ‘Breaking the Logjam’ (DETR, 1998b). The 2000 Transport Act (TSO, 2000) contains powers for English and Welsh local authorities to introduce ‘road user charging’ schemes provided they form part of an integrated transport plan. The legislation allowing for the implementation of congestion charging in Central London was made available earlier under the Greater London Authority Act (TSO, 1999). In Scotland, the Integrated Transport Bill (TSO Ltd, 2000) included proposals for congestion charging. The Scottish Transport Act was approved in 2001 (TSO Ltd, 2001).

There are a variety of urban road pricing methods and sometimes a confusing variety of names are given to the schemes. It is therefore useful first to define the types of road pricing presented in this paper. These terms are defined within the UK examples provided below.

3.1. Area Charging: London

Area charging applies to vehicles for accessing and travelling within a specified area by providing a license (paper permit) or charging (cameras, smart cards) to enter a certain defined area. It does not restrict how many journeys a license holder can make within the area and could be more refined as a congestion tackling tool. The London Congestion Charging scheme (2003) operates as area charging. Trondheim, a Norwegian scheme which ceased operation at the end of 2005, started off as a cordon charging system. Seven years later, in 1998, it advanced to a pseudo-area-based charging by dividing the initial area into several zones and introducing a charge for trips within zones (Ieromonachou *et al.*, 2006a).

3.2. London

Central London has had a long running and serious traffic congestion problem. Over the years, a number of measures had been implemented to tackle the problem but none managed to do so effectively. The Congestion Charge scheme was introduced in February 2003, following an intense planning and advertising campaign led by Mayor Ken Livingstone. A fee of £5 GBP (€7.3)¹ was initially charged to motorists entering and travelling within a central zone of a 5km radius between the hours of 7 a.m. and 6.30 p.m. on weekdays (TfL, 2003). The £5 charge was expected to deter 10-15% of vehicles entering the zone and reduce journey times by 25% but in practice reduced cars by around 20% and congestion by 30% compared with the last few weeks before charging. This better than expected impact upon traffic reduced the revenue generated from an expected £130m (€190m) to around £90m (€131m).

The initial charged area represented only 1.3% of the total Greater London area but around 200,000 vehicles were driving into the charging zone every day. From these, the charge applied to about 110,000. Exemptions included: 100% reduction to taxis, emergency vehicles, disabled badge holders as well as other groups and 90% reduction to residents of the zone (TfL, 2004). A network of video cameras in positions throughout the charging zone enforces the scheme. There are also a number of mobile units with cameras that patrol within the zone. Payment can be made to any of the 9,500 UK-wide Pay Points, at various petrol stations and shops throughout the UK. Payments can also be made by phone, SMS text, or the internet.

The traffic impact outside the congestion charging zone has, contrary to expectations, been minimal. To accommodate modal transfer, 300 additional buses, offering 11,000 places were added to the already extensive bus network of London increasing bus usage by more than 7%. Making radical improvements in bus services was one of the Mayor's ten priorities for transport in London (TfL, 2004). Plans for extension of the charging zone westwards were approved by the Mayor of London in 2005 (TfL, 2005) and became operational in February 2007. A year after, criticisms regarding high processing costs, ambiguity over the use of the improvements budget and increasing congestion were raised (Swinford, 2007). These comments add to pressure against acceptability that could affect future schemes in the UK.

¹ Exchange rate at time of writing £1 GBP ≈ €1.46 Euro. The charge was increased to £8 (€11.7) in July 2005.

3.3. Cordon Charging: Durham and Edinburgh

Cordon charging involves charging drivers crossing a designated boundary for a specific area – usually the city's central business district (CBD). Drivers pay a charge dependent on how many times the boundary is crossed. The fee can be levied using manual methods – either by manned toll booths or coin operated machines, as well as electronic tags – relatively simple read/write tags or smart card technology.

With one point controlling access to the Peninsula, the Durham scheme operates as a cordon scheme. Had it been implemented, the Edinburgh scheme would have operated a dual cordon scheme. Successful examples of cordon charging (toll rings) are found mainly in Norway where the policy has developed into a niche after most major cities adopted the measure (Ieromonachou et al., 2006a).

3.4. Durham

Durham is in the North East of England and there the council had been trying to restrict city centre traffic to the 'Peninsula' area since 1949. This area is a designated UNESCO World Heritage Site because of its religious and architectural significance and protecting it from traffic pollution is important.

For its size, the area had particularly acute traffic problems with Saddler Street, a single track road, the Peninsula's only access thoroughfare. Of the 3000 vehicles that entered the area each day prior to the scheme being adopted, 50% used the road as a 'mobile parking' area thus contributing to congestion. Congestion was high because of the sheer number of vehicles and pedestrians concentrated in a small street – around 13,000 pedestrians accessed the area each weekday and 17,000 on Saturdays (DCC, 2000). The situation in the area was untenable, threatening the viability of local businesses and damaging the appeal of the Durham Peninsula as a World Heritage Site. Various measures had been proposed and tried over some 20 years, but failed to solve the problem. The agreed aim for the Peninsula was to significantly reduce the pedestrian and vehicular conflict by removing a substantial proportion of the existing traffic through a road user charge. A key part of introducing the congestion charge was the provision of alternative means of access to the Peninsula, and discussions with public transport users resulted in the launch of a new minibus service, the 'Cathedral Bus', that began operating some two months before the congestion charge was introduced (DCC, 2002).

The Durham Road Access Charge Scheme began operating in October 2002, the first to take advantage of road user charging powers granted in the Transport Act 2000 (TSO, 2000). Motorists pay a £2 (€2.95) charge to exit the area on Monday to Saturday between 10am and 4pm (DCC, 2003). An exit charge was preferred as it allows free flow of vehicles into the area, preventing traffic queues back to a nearby major road. It was estimated before the implementation that there would be a 50% reduction in vehicle access to the area. For the remaining traffic, a very generous 70% would have permits and 30% would be liable to pay. The first evaluation of the scheme (DCC, 2003) showed the reduction of vehicles to be around 85% so the permit allocation, despite the fact that it seemed generous, has not affected the scheme's traffic reduction impact.

3.5. Edinburgh

The Scottish capital city, like Durham, is a World Heritage site, a major financial and commercial centre and a major generator of economic activity for the region as well as the country. Growth in car ownership and use has caused traffic levels in certain roads to increase by up to 60% in the last 20 years, which in turn has caused congestion, parking problems and air pollution (Edinburgh Council, 2003). Edinburgh Council, proposed to introduce a congestion charging scheme to directly reduce the number of vehicles using Edinburgh's road network whilst at the same time raising revenue for public transport improvements. Without the charging scheme, transport models (MVA, 2000a; 2000b) predicted traffic level increases of around 30% by 2021, as well as increased time lost due to congestion.

If implemented, the proposed scheme would have charges levied at roads crossing two cordon lines: an inner cordon defined by the boundaries of the centre of Edinburgh and an outer cordon inside the city bypass. A daily, one-off charge would be collected from vehicles travelling inbound across the cordons and only during the charging period. The two cordons would operate from Monday to Friday with slightly different schedules, with the inner one from 7 am until 6.30 pm, while the outer cordon would operate in peak times between 7 am until 10 am and between 4 pm until 6.30 pm. The scheme would operate with cameras so that no toll barriers or charge points would add to delays. If successful, the Council was committed to spending all net revenue raised by the charging scheme on transport projects and services, in addition to the existing public sources of transport funding. Prior to any charging scheme being introduced, there would be a £100 million up-front investment to improve the city and regional public transport network. Over £100 million was already estimated as public sector funding for projects within Edinburgh and southeast Scotland (tie, 2003).

The Council had claimed throughout its campaign that their first priority was to make the scheme fair and socially inclusive. In February 2005, Edinburgh residents were asked to vote for or against the Council's transport proposals which included plans for the congestion charge and a package of planned transport improvements funded from the charging revenue. From a turnout of around 62 per cent, 75 per cent (133,678 voters) were against the proposals for the charging scheme. Voters explained that the Council failed to convince them that the proposals for the charge were sufficiently equitable and that the scheme would have hurt the local economy as well as pushing traffic into the residential areas of the city (BBC, 2005). A range of issues was responsible for the way Edinburgh's residents voted in the referendum, but most importantly people's perceptions on issues of fairness and taxation (Saunders, 2005). Derek Turner, one of the designers of the successful London charging scheme, pointed out that Edinburgh should have avoided the referendum and brought as an example the Stockholm compromise where the local authority agreed for the public to vote on a charging scheme after it operates for a year.

4. Support to local authorities for implementing policy packages – the Transport Innovation Fund

The 2004 transport White Paper (DfT, 2004a) announced the intention of creating a Transport Innovation Fund as support to local authorities interested in using demand

management to reduce traffic congestion. The White Paper explained the role of policies in managing demand but warned that, on their own, such policies will not be sufficient to prevent congestion spreading for longer periods of the day and for more road users. Congestion problems need integrated solutions from the local authorities and the TIF will help putting in place policy packages that combine effective radical schemes with measures that promote modal shift and better public transport.

Guidance for the TIF was outlined in another report from the Department for Transport in 2005. The fund is looking in particular to support:

- Smarter, innovative local transport packages that combine demand management measures such as road pricing with modal shift measures such as better bus services;
- Innovative mechanisms to raise new funds;
- Schemes that will be beneficial to the national productivity.

The Fund was established to tackle the twin objectives of reducing congestion and improving productivity. In effect, the fund is particularly looking to fund schemes that can pilot approaches to road pricing elsewhere as well as provide benefits locally. Proposals for TIF funding are divided into “congestion schemes”, for which bids are invited from local authorities, and “productivity schemes”, which are determined by the DfT after consultation with the Regional Development Agencies. Congestion TIF schemes are expected to consist of demand-management measures such as road-pricing, accompanied by complementary public transport improvements. Productivity TIF schemes will be regional, inter-regional, inter-urban and, exceptionally, local packages which have the potential to make productivity gains at the national level. Examples might include improved surface access at a port or airport, or improved inter-urban connections which create significant reduction in business costs.

Local authorities applied to the Department for Transport and asked for support in developing their proposals to enable them to come forward with business cases in 2007. The Department for Transport has supported those authorities that came forward with detailed innovative schemes to address specific local congestion problems. Successful bids for two rounds of pump-priming funds for congestion schemes were announced by the Department in November 2005 and 2006. On November 2006 £7.5 million (€11 million) of pump-priming funds were awarded to support the development of seven local TIF packages that combine demand management, including road pricing, with better public transport. Ten packages (see Table 1) were supported in total under the TIF programme.

Table 1: The ten TIF winners of both rounds.

		<i>Total Funding</i>
Large Conurbations		
G. Manchester		£3,200,000
Tyne & Wear		£1,700,000
W. Midlands		£3,200,000
Cities and Towns		
Cambridge		£1,440,000
Durham		£350,000
Norwich		£250,000
Reading		£680,000
Shrewsbury		£857,800
Mixed Areas		
W of England		£1,495,000
E. Midlands		£1,800,000

Note: Adapted from Crawford, 2007

Examples of cities that have been successful in TIF funding include among others Durham and Cambridge which are better known as areas of historical interest as well as their association with road pricing. Both cities are based on an ancient/historic layout which makes it difficult in many cases to add capacity to the network in certain areas and with a high percentage of those employed in the city centres coming in as morning traffic from outside. Each place is planning a different trial to conduct based on local and regional characteristics and requirements. Cambridge, for example, is only engaged with modelling studies with high level stakeholders, whilst Durham – which already has a RUC scheme in place – is considering expanding the access control area.

The UK government promised up to £200 million per year from TIF will be made available for such packages. The Fund is forecast to grow from £290 million in 2008–09 to £2.5 billion in 2014–15. It is expected that small schemes could be up and running by 2010-11 and larger local schemes within two years of that. Any subsequent proposals on a national road pricing scheme will require new primary legislation. It will help local authorities to develop well designed schemes which are, where appropriate, consistent with each other and any future local or the proposed national scheme.

5. Key implementation factors

Road pricing is a complex market based instrument and its implementation does not depend on a single issue. This section details a number of critical factors relating to the implementation of road pricing. The factors cannot be considered complete as each scheme can bring in its own complexity, but they represent areas of concern identified in previous research in three European countries (Ieromonachou, 2005). Other studies have identified similar issues concerning the implementation of road pricing based on scenarios (Glaister and Graham, 2005) and game theory (Levinson, 2005) or implementation steps (Ison and Rye, 2005). Some relate to the factors presented in this paper, but do not concentrate on a network based analysis. Below, a brief analysis explains each of the six factors and how they function within the implementation network.

These six factors are referred to as: the partner-actor network, the project champion, the expectations and motivations (of the groups within the implementation network), the protection measures, network learning, and user learning/acceptance. Each of these is explained in more detail below.

5.1. Partner-Actor Networks

Around any policy measure are networks of affected groups – businesses, interest groups, neighbouring local authorities and local residents. These seek to influence or be part of the policy development process. The active involvement of such groups in policy development and implementation is seen as essential (Gillingwater and Ison, 2003). Glaister *et al.* (1998, p10) emphasised that: “...*anyone with an interest in transport policy who wants to exercise an effective influence in that process needs to understand who the actors are, how they relate to one another, what powers they exercise and what constraints they face*”.

In this paper, a categorisation of such ‘stakeholders’² has been adopted, developed in earlier work by the author and based on innovation management studies (Hoogma *et al.*, 2002; Geels, 2002; Rothwell, 1992; Schot and Rip, 1996). A distinction has been made between two groups: (a) *the partners*, those actively involved in the planning, implementation and operation of a scheme, and (b) *the actors*, users and other groups that were affected by the measure and may have been indirectly involved in the decision-making process. In almost all cases, the leading Partner (or project manager) has been the Local Authorities, represented either by a strong champion or group. The first stage of the analysis is to identify the Partner-Actor network for developing and implementing a policy initiative. The partner-actor network then constitutes the implementation network for that specific initiative. The implantation network was apparent in all the investigated cases, but the level of involvement of partners and actors differed in each project. All cases required a wide partner network to implement their respective schemes and this involved a complex project planning system. Even in the case of London where the key partner appears to be TfL headed by the Mayor, there were a large number of groups working for this and they were all grouped under the aegis of TfL³. The importance of particular relationships in each Partner-Actor network varied with the institutional context in which they were placed. It cannot be generically said that a certain set of links were more important than others. An important aspect of the analysis is that this context (regional context) is mapped and from this an understanding of key relationships emerges.

The UK schemes started with no user familiarity with road user charges and also sought to cut traffic flows. This combination required a wider partner/actor network and thus the project planning system and network had to be largely created anew. Durham did try initially to introduce Access Control using a very restricted partner network but that failed. Later, Durham identified and empowered a wide range of community stakeholders, developing relationships with them and drawing them in to become partners to the scheme. The way in which the County Council also promoted actors in the scheme into partners was probably one of the most interesting and important factors. The scheme therefore was protected by a network of partners and actors that wanted a solution of the problem that existed in the area. As it would be expected, the London Congestion Charging scheme required a great number of stakeholders to be involved in its planning, implementation and management operations. It appears that not many seemed involved due to the fact that the Mayor and Transport for London (TfL) combined the majority of the most essential partners that invested in the scheme. London had all vital partners grouped under the aegis of one ‘lead player’, TfL although the London Boroughs remained independent and some have been the focus of opposition. Despite a niche being created in urban road pricing policies by the London and Durham schemes, the Edinburgh project failed to get past the design stage. The majority of the voters in Edinburgh failed to accept the importance of the policy in reducing the use of private vehicles in the city and the potential benefits it would have brought to their overall mobility. The politicians were not close enough to the population to understand their needs.

² The term ‘stakeholder’ is used here to mean any affected group. More restricted meanings are sometimes used (e.g. by TfL to mean only “corporate” interested bodies.)

³ Boroughs are not part of TfL but are highway authorities for much of the London road network; furthermore, the Underground remained under Government control until the PPP was finalised.

5.2. Project champion

Where projects involve complex systems of partners and actors, the management process needs a mechanism to provide focus and drive. This is particularly so for innovative projects involving the creation of new networks. This role is one that can be filled by project champions - charismatic individuals that spearhead projects. Support of politicians is vital to the introduction of any road-pricing scheme whether a charismatic project champion exists or not. The project champion emerges as a critical part of the process of getting the charging system into place. The champion leads and many times influences decisions made by the entire implementation network.

All schemes examined had some type of champion figure or change agent but this varied, with the role being an individual (London) or community group (Durham). In some places (such as London) the champions held special places (such as a government office) and their personal motivation could have linked to motives beyond the scope of transport policy. By contrast, in Edinburgh “no independent champion of the scheme, political or not political, emerged to build support” (Saunders, 2005).

5.3. Expectations – Motivations

It is interesting to note how the expectations of different partners and actors gradually become aligned. Normally for this to happen, a shift in expectations would have occurred. The next stage in the analysis is to explore the motivations and the extent to which the different expectations of partners and actors come together. Many of the parties taking part bring their own notions, values and beliefs with them, which may be summarised as their motivations. When examined, motivations help explain why each group became involved in a road pricing scheme in the first place and the amount of commitment they have towards it. Sometimes motivations are very obvious and in some cases they develop or evolve during the various scheme phases. Motivations are intrinsically linked to the expected outcome of the scheme. These expectations of partners and actors are useful to analyse for many reasons. A real danger sign is where a scheme involves partner and actors who have very different expectations and conflicting motivations.

It is of note that behind the transport reasons for the road pricing schemes referred to in this paper there were deeper motivations than simply transport policy. For example, protection of historical buildings was of great importance in Durham and Edinburgh. In London the main motivation was the economic cost of congestion and the direct transport benefits. Tapping into the core motivation of key actor groups is therefore important. In Durham, groups that would otherwise be seen as actors in the scheme were brought into the network as partners. Once integrated into the network, they were able to voice their concerns and thus working towards materialising their expectations.

5.4. Protection measures

These are complementary actions benefiting users to support road pricing policies. Previous work (Ieromonachou, 2005) has categorised protection measures into two forms: (a) *Enhancement Protection*, which are actions that enhance the effect of road pricing (like the provision of extra public transport capacity to facilitate modal shift from car, subsidies to reduce public transport ticket prices, reallocating road space for pedestrians and bicycles etc.); (b) *Compensation Protection*, where there are full or part

exemptions from charges for certain groups of users, for social or transport policy reasons. Typically the latter include buses, taxis, disabled drivers and local residents.

Both types of protection measures are particularly needed for innovative or unfamiliar policy measures and are closely related to the level of acceptance achieved (considered below). Enhancement Protection measures featured strongly in the London and Durham schemes. These were therefore an inherent part of both schemes. A major part of enhancement protection in London was enhancing public transport services and the London experience shows how much can be accomplished in a relatively short amount of time and with relatively low capital (e.g. providing an extra 300 buses). Durham also introduced the Cathedral bus service to provide alternative access to the charging area.

5.5. Network Learning

Successful development of a specific policy niche depends on the local level of innovation processes and stakeholders' behaviour. If the innovations (in this case road pricing policies) are successful, then the niche they create will become known and may be adopted more widely. Niche development can be evaluated by the level of learning and the level of institutional embedding. Hoogma *et al.* (2002, p.28) appreciate the learning that occurs through a range of processes of articulating "relevant technology, market and other properties" but enhance this notion by suggesting that a second-order learning is required for niche development to result in a regime shift. This form of learning will involve a co-evolutionary learning (Wynne, 1995) that will draw in the partners and actors involved in the scheme but also third parties like governments that can help in the institutional and societal embedding. Learning processes need to extend beyond the immediate local network of stakeholders. This is where the wider issue arises of what contributes to acceptance of a policy measure.

Each of the cities referred to in the paper used incremental processes but in different ways. All the successful schemes have used an incremental approach with flexibility to experiment and adapt. As the process unfolds, many of the barriers would be (or in effect be seen) as less dramatic, particularly by actors. Radical policies require a relatively un-complicated start and a pre-defined 'test' phase that would allow for problems like political and public acceptability to gradually normalise. Even London, a case praised for its "courage and rapid execution" (Grush, 2005), used incremental processes. This refers firstly to the initial choice of ANPR (automated number plate recognition) as enforcement technology which was expensive but it constituted tested technology that could easily and quickly be put in place in time for the proposed start date. After the scheme was established, experiments started with GPS (global positioning system). An incremental evolution in the technology path could easily follow a successful scheme. Secondly, a relatively small area was chosen for the initial charging zone for reasons of cost and technical feasibility. An incremental approach has emerged with the expansions of the zone in 2007 – which builds on existing experience and network learning.

An important part of learning by the network of partners and actors involves understanding user needs and attitudes towards a policy measure such as road pricing. Understanding user attitudes and needs for a number of policy measures (that could include road pricing and other measures) will support the design of protection measures.

5.6. User Learning/Acceptance

A number of studies took place in order to establish the social aspects and acceptability of transport pricing policies in the UK (Jones, 1998; Preston *et al.*, 2000; Rajé, 2003). In the UK, Ison (2000) found that approximately 80% of surveyed people viewed urban road pricing as being publicly unacceptable. This point was supported by findings from an RAC study (2002) that 83% of motorists would find it very difficult to adjust to a lifestyle without the car. The same report argues that most would find road tolls acceptable if there were equivalent reductions in fuel duty or as part of a package for better roads, public transport and traffic management. The *TransPrice* project (1999) concluded that the lack of political willingness to implement charging measures stems from the electorate's perceived low acceptability for such measures. Other studies showed the acceptability of road pricing depends upon perceived benefits and the justification given for the development of such a programme in the selected area (Jones, 1998; Schade and Schlag 2003). This links in to the motivation/expectation and protection measures. It is clearly important to take into consideration both in the design and implementation of the scheme the views that arise within the general public. Acceptability needs to be considered seriously by implementers and government officials. The public still has little knowledge of the possibilities of pricing policies as solutions to traffic congestion over other policies.

Incremental approaches permit learning and enhance understanding and acceptance. In the UK there was little experience of road charges or even city centre access control zones, which meant that the London and Durham schemes involved something entirely new. In all cases, acceptance of road pricing required a widespread acceptance that it was needed to address an accepted problem. In London and Durham it was congestion; it is essential that the charging scheme is seen as a solution to an accepted problem. In Edinburgh, people that voted against the proposed scheme considered that congestion was not a big problem.

There are many difficulties when introducing a radical transport scheme like road user charging. There are always a number of technical difficulties but however complex such issues may be, they rarely compare with the social barriers linked with such a process (Langmyhr, 1997). Dealing with all the diverse opinions of the different stakeholders, users or affected groups and most importantly finding the way to win the support of the majority of the public can be made easier if the project is explained and the benefits of such a venture are clearly identified. Improvements to transport (private and public) prior to the charging would benefit the image of the scheme as performing well.

In practice, many politicians see the London experience as exceptional and identify more closely with the politically damaging outcomes in Edinburgh. The issue of user learning and acceptance, and the need for implementation processes that facilitate this, is therefore as important as ever. The success of both the London scheme and Ken Livingstone's re-election revived the Government's interest in road pricing. This led to the rapid development of proposals for a national congestion charging scheme, preceded by local trials financed under the Transport Innovation Fund (TIF).

6. Moving towards change

One of the main conclusions of this paper is that solutions to problems caused by transportation systems are very much contextual issues. Most places in the UK and especially rural areas do not experience London's levels of traffic. Findings from the cases show that recognition of the problem is vital as well as incremental implementation. Avoiding this incremental implementation and jumping straight to a national scheme in 10 to 15 years does not register as good practice.

Implementation requires work from system builders and project champions. The overall process involves the change of users' attitudes and institutional structures and requires, apart from time, planning. The research conducted, which this paper forms a part, showed that users' response to proposed measures plays an important role in the final outcome of the project. In many cases, management (partners) were the main driving force for introducing a measure but users and other groups (actors) had an active role in the shaping of a measure. However, despite the efforts of local authorities and their networks, it remains crucial for the central government to remain active on the measure. Glaister *et al.* (1998) judge that: "*Transport policy is not a technical issue which can be debated and decided between experts. It has been and remains a political decision*".

The announcement in June 2005 for a National Road Pricing Scheme combined with the 2004 White Paper on transport (DfT, 2004b), marks a shift in the approach to local road pricing measures. The previous policy was to provide enabling powers for local authorities to introduce RUC (DETR 1998a, 1998b). The new policy is for a radical, nationwide scheme. There is a danger that this will not permit a gradual adaptation, learning and user understanding that this paper has shown to be so crucial for the successful implementation of local schemes. The paper suggests that phased measures (in the form of local urban schemes) would be crucial as 'stepping stones' towards the countrywide solution, a view supported in the announcement of the Transport Innovation Fund to support such ventures. Evidence from the existing UK schemes suggests that continuous support to local schemes would aid the spread of the urban road pricing niche and a gradual acceptance of the policy at the local level. Combined with tolled roads and charging in urban centres the transition would become easier. This review of UK experience indicates that the key to this is the decision making and planning part of the overall implementation process. The role of transport professionals is not just implementation in the "old sense" – i.e. building roads – but implementation in a new sense of integrating decision making and planning. The need for a consistent and integrated approach to management and operations results from a series of drivers, including: growing and changing demands; unsustainable trends; increased user expectations; constraints on traditional approaches; and, the introduction of new communication and control technology.

7. Conclusions - Concluding remarks

The analysis framework described in this paper was not structured only for the UK cases and it is likely that it could be applicable if considered elsewhere. It also seems feasible that the relevance of road pricing would be enhanced as experience in its use, especially when introduced in policy packages with other measures, builds up. The TIF schemes, made known a year after the plans for an eventual national congestion charge

in the UK, could possibly provide stepping stones to such learning. The formation of local policy niches would help in building up people's (both partners and actors) knowledge, experience and understanding of road pricing. But it is also important to contain all the important elements for learning that have been vital in previous successful schemes.

In summary, the main issues observed in all cases examined have been grouped under six factors that capture the basic structure of a road pricing implementation process. These factors would support the implementation of integrated policies as the complex implementation networks would operate with more balanced motivations/expectations. In summary, possible key factors to consider are:

- Managing the partner network for implementing a road pricing scheme can be a complex task. This can involve new skills and tasks than are normally involved in more traditional local transport measures;
- Radical policies need a champion to spearhead their implementation;
- Identifying and understanding core motivations of actors that the measure could support;
- Protection measures to support the road pricing policies are needed most where demand management is involved and where tradeoffs between policies can endanger their efficiency and acceptability;
- Understanding, informing and empowering actor groups is important for winning widespread acceptability;
- Learning occurs at many levels and in many ways. It is important for a new scheme to build on existing processes and measures to promote learning.

Policies reinforce each other and offer protection such as for example enhancing public transport before introducing restraint measures. This protection stems from the alignment of goals (expectations-motivations) of partners' and actors' and from the action (tradeoffs) one policy can have on the negative impacts of another.

Combining policies into packages is necessary when considering the interactions between different measures. This is reflected in the government's approach that "*no single policy will meet all of our future transport needs, which is why our strategy is based around a broad package of measures*" (DfT, 2007). Using a policy package approach does not guarantee success, but it offers opportunities to have potential or alternative routes to implementation for difficult and controversial policies such as urban road pricing.

Acknowledgements

The authors would like to thank three anonymous referees for their useful comments and criticisms when reviewing this paper. Any remaining errors and omissions should be directed to the corresponding author.

References

- Banister, D. (2004). *Unsustainable Transport*, Transport, Development and Sustainability, Spon, Oxford.
- BBC (2005). BBC News-Scotland, Congestion Charging: Your views, Online discussion forum, A referendum in Edinburgh has rejected the idea of introducing congestion charging, available at: <http://news.bbc.co.uk/1/low/scotland/4287967.stm> [Accessed on 22/02/2005].
- CORDIS (1999). START – Development of strategies designed to avoid the need for road travel, Transport RTD Programme - Research for Sustainable Mobility, Final Summary Report.
- Crawford, D. (2007). Expanded roles for TIF winners, ITSS, Vol. 8, pp. 6-9.
- DCC (2000). Durham County Council: Possible measures to reduce traffic in Market Place and Saddler Street, Transport Steering Group, Durham City, 1 August 2000.
- DCC (2002). Durham County Council: Results of the Consultation on Proposed Congestion Charging Order in Market Place and Saddler Street, Transport Steering Group, Durham City, 9 January 2002.
- DCC (2003). Durham County Council: Saddler Street Road User Charge Scheme – Monitoring Report, Transport Steering Group.
- DETR (1998a). Department of the Environment, Transport and the Regions: A New Deal for Transport: Better for Everyone – The Government’s White Paper on the Future of Transport, Cm 3950, London, The Stationery Office.
- DETR (1998b). Department of the Environment, Transport and the Regions: Breaking the Logjam, The Government’s consultation paper on fighting traffic congestion and pollution through road user and workplace parking charges, London, The Stationery Office.
- DfT (2004a). Department for Transport, Feasibility Study of Road Pricing in the UK, Report, 20 July 2004.
- DfT (2004b). Department for Transport, The Future of Transport: A Network for 2030, Cm 6234, White Paper, July 2004.
- DfT (2005). Department for Transport, The Transport Innovation Fund, 5 July 2005.
- DfT (2007). Local Transport Bill Consultation, Volume 1, available at: <http://www.dft.gov.uk/consultations/closed/localtransportbill/consultationdoc?page=4> [Accessed: 26 Mar 08].
- Docherty, I. (2003). Policy, Politics and Sustainable Transport: The Nature of Labour’s Dilemma, in Docherty, I. and Shaw, J. (eds.), *A New Deal for Transport?*, Blackwell Publishing Ltd, RGS-IBG Book Series, ISBN 1-4051-0630-1.
- Docherty, I. and Shaw, J. (eds.) (2003). *A New Deal for Transport?*, Blackwell Publishing Ltd, RGS-IBG Book Series, ISBN: 1-4051-0630-1.
- Eddington, R. (2006). The Eddington Transport Study, The case for action: Sir Rod Eddington’s advice to Government, ISBN-10: 0-11-840482-2, December 2006.
- Edinburgh Council (2003). City of Edinburgh Council: Statement of Reasons, The City of Edinburgh Council and Transport Initiatives Edinburgh Limited Integrated Transport Initiative Statement for the Proposed Congestion Charging Scheme.
- Feitelson, E., Salomon, I. and Cohen, G. (2001). From policy measures to policy packages: a spatially, temporally and institutionally differentiated approach, in Feitelson, E. and Verhoef, E. (eds). *Transport and Environment – In search of sustainable solutions*, Edward Elgar, UK.
- Geels, F. W. (2002). *Understanding the Dynamics of Technological Transitions - A co-evolutionary and socio-technical analysis*, Twente University Press, The Netherlands.
- Gillingwater, D. and Ison, S. G. (2003). Planning for Sustainable Environmental Futures, in: Hensher, D. A. and Button, K. J. (eds), *Handbook of Transport and the Environment*, Elsevier, Amsterdam, pp.547 - 563.
- Glaister, S., Burnham, J., Stevens, H. and Travers, T. (1998). *Transport Policy in Britain*, Public Policy and Politics, McMillan, ISBN 0-333-69349-3.
- Glaister, S. (2001). UK Transport Policy 1997-2001, Paper delivered to the Economic Section of the British Association for the advancement of Science, Sep 4th, 2001, Glasgow.
- Glaister, S. and Graham, D. J. (2005). An evaluation of national road user charging in England, *Transportation Research Part A*, Vol. 39, pp. 632-650.
- Goodwin, P. (2003). Towards a Genuinely Sustainable Transport Agenda for the United Kingdom, in Docherty, I. and Shaw, J. (eds.), *A New Deal for Transport?*, Blackwell Publishing Ltd, RGS-IBG Book Series, ISBN 1-4051-0630-1.
- Grush, B. (2005). An Optimal System Design for GNSS-based Road User Charging, Association for European Transport and Applied Location Corporation, Originally published for AET-ETC-2005.

- Hine, J. and Preston, J. (eds.) (2003). *Integrated Futures and Transport Choices – UK Transport Policy - Beyond the 1998 White Paper and Transport Acts*, Ashgate Publishing Ltd, ISBN 0-7546-1991-5.
- Hoogma, R. J. F., Kemp, R., Schot, J. and Truffer, B. (2002). *Experimenting for Sustainable Transport: the Approach of Strategic Niche Management*. Spon Press, London.
- Ieromonachou, P. (2005). *Analysing the Implementation Process of Urban Road Pricing Schemes*, PhD Thesis, The Open University.
- Ieromonachou, P., Potter, S. and Warren, J.P. (2006a). Norway's urban toll rings: evolving towards congestion charging, *Transport Policy*, Vol. 13, Issue 5, pp. 29-40.
- Ieromonachou, P., Potter, S. and Warren, J. (2006b). Evaluation of the implementation process of urban road pricing schemes in the UK and Italy, *Trasporti Europei (European Transport)*, Issue no.32, April 2006, pp. 49-68.
- Ison, S. (2000). Local Authority and Academic Attitudes to Urban Road Pricing: A UK Perspective, *Transport Policy*, Vol. 7, pp. 269-277.
- Ison, S. (2004). *Road User Charging: Issues and Policies*, Ashgate.
- Ison, S. and Rye T. (2005). Implementing Road User Charging: The Lessons Learnt from Hong Kong, Cambridge and Central London, *Transport Reviews*, Vol. 25, 451-465.
- Jones, P. M. (1998). Urban Road Pricing: Public Acceptability and Barriers to Implementation, in K. J. Button & E. T. Verhoef (eds.), *Road Pricing, Traffic Congestion and the Environment. Issues of Efficiency and Social Feasibility* (pp. 263-284). Cheltenham, Edward Elgar Publishing.
- Langmyhr, T. (1997). Managing Equity – The Case of Road Pricing, *Transport Policy* Vol. 4(1), pp. 25-39.
- Levinson, D. (2005). Micro-foundations of congestion and pricing: A game theory perspective, *Transportation Research Part A*, Vol. 39, pp. 691-704.
- Maddison, D., Pearce, D., Johansson, O., Calthorp, E., Litman, T. and Verhoef, E. (1996) *Blueprint 5: The True Cost of Transport*, Earthscan, London.
- May, A. D., Kelly, C. and Shepherd S. (2005). *Integrated Transport Strategies*, in: Button, K. J. and Hensher, D. A., *Handbook of Transport Strategy, Policy and Institutions*, Oxford, Elsevier.
- MVA (2000a). *Edinburgh Road User Charging Study – Initial Transport Modelling Report*, January 2000.
- MVA (2000b). *Edinburgh Road User Charging Study – Second Transport Modelling Report*, March 2000.
- Potter, S. (2001). Crisis?-Which Crisis? *The Parliamentary Monitor*, Transport, March 2001.
- Potter, S. (2004). Transport Tax Reform and the Environment, *Energy and Environment*, Vol. 15, No. 6, pp. 1093-1098.
- Preston, J., Holvad, T., Hine, J. (2000). *Impacts of Road User Charging and Work Place Parking Levy on Social Exclusion/Inclusion: A Scoping Study prepared for Department of Environment, Transport and the Regions*.
- RAC (2002). *Motoring towards 2050 – An Independent Inquiry*, RAC Foundation, London.
- Rajé, F. (2003). The impact of transport on social exclusion processes with specific emphasis on road user charging, *Transport Policy* Vol.10, pp. 321-338.
- Rothwell, R. (1992). Successful Industrial Innovation: Critical Factors for the 1990s, *Research and Development Management*, Vol. 22, Issue 3, pp 221-239.
- Saunders, J. (2005). The rise and fall of Edinburgh's congestion charging plans, *Proceedings of the Institution of Civil Engineers Transport Journal*, Vol. 158, pp 193-201, ICE, London.
- Schade, J. and Schlag, B. (2003). *Acceptability of Pricing Reform*, Paper prepared for the IMPRINT-EUROPE seminar 13-14 May, 2003.
- Schot, J. and Rip, A. (1996). The Past and Future of Constructive Technology Assessment, *Technological Forecasting and Social Change* 54, 251-268.
- Smeed, R. J. (1964). *Ministry of Transport: Road Pricing - The Economic and Technical Possibilities*, Panel Report, HMSO, London.
- Swinford, S. (2007). *British cities shun London's wasteful car tax*, available at: <http://www.timesonline.co.uk/tol/news/uk/article3022505.ece>, [Accessed: 14/04/08].
- TfL (2003). *Transport for London: Annual Report 2002/03*, Available at: <http://www.tfl.gov.uk/tfl/about/report-library/annual-reports/2003/mayor.shtml>, [Accessed: 06/02/2004].
- TfL (2004). *Draft Transport Strategy Revision: Central London Congestion Charging*, Report to the Mayor following consultation with stakeholders, businesses, other organisations and the public, Volume 1.
- TfL (2005). *Transport for London: Western Extension to the Congestion Charge*, Available at: <http://www.tfl.gov.uk/tfl/cc-ex/index.shtml>, [Accessed: 15 Dec 2005].

- tie (2003). Integrated Transport Initiative for Edinburgh and South East Scotland, Progress during 2003 and proposed Charging Order, Appendix 3, 10 September, [Document T93].
- TSO (1999). The Greater London Transport Act, Stationery Office, London.
- TSO (2000). Transport Act 2000, Stationery Office, London.
- TSO Ltd (2000). The Stationery Office Limited: The Integrated Transport Bill – The Executive's Proposals, Scottish Executive.
- TSO Ltd (2001). The Stationery Office Limited: Transport (Scotland) Act 2001, ISBN 0 10 590012 5.
- Verhoef, E., Lindsey, R., Niskanen, E., de Palma, A., Moilanen, P., Proost, S., and Vold A. (2008). Implementation paths for marginal-cost-based pricing in urban transport: theoretical considerations and case study results. In *Road Pricing, the Economy and the Environment*, edited by Jensen-Butler, C., B. Sloth, M.M. Larsen, B. Madsen and O.A. Nielsen, Springer Verlag, Advances in Spatial Science.
- Wall, G., Felstead, T., Richards, A. and McDonald, M. (2008). Cleaner vehicle buses in Winchester, *Transport Policy*, 15, pp. 55-68.
- Whitelegg, J. (1993). Transport for a Sustainable Future – The Case for Europe, John Wiley and Sons Ltd, ISBN 0-471-94791-1.
- Wynne, B. (1995). Technology assessment and reflexive social learning: observations from the risk field, in Rip, A., Misa, T. J., and Schot, J. (eds.) *Managing Technology in Society - The Approach of Constructive Technology Assessment*, Pinter, pp.19-36, London.