

CUPID INTERNAL WORKSHOP THURSDAY 8TH MAY 2003, GENOA

PART I: THE RESULTS OF TRIALS

GENOA (MARCO MASTRETTA) BRISTOL (ALISTAIR COX)

1. GENOA

1.1 Background

The recent road pricing (RP) user trial provided important insight into the difficulties of giving exhaustive information to citizens about how the RP scheme worked. In spite of the detailed and customized information given, a number of people had problems with understanding precisely how the scheme worked. This was possibly due to the limited number of subjects involved. A full scale scheme would face the problem of managing an even more complex programme of communication.

1.2 How should road users be charged?

In Italy the existing Telepass circuit means that the organisational framework is already in place. As the cost of extending the existing system is comparatively low, a wide application could be envisaged. For those citizens not using the Telepass, two different processes must be designed:

- The possibility of buying “entry tickets” (before transit toll collection) in a large number of places around the city: This option could be quite complex and expensive as it requires sales points equipped with adequate technology; on the other hand, money collection is easy. It is very flexible as it can be used by non residents of the city.
- The possibility of adopting the same money collection process as already used for the payment of some taxes (after transit toll collection). This gives the possibility of using an organizational structure already operating on a full-city scale at marginal costs with respect to the current situation. This solution is not suitable for citizens who are not resident in the city.

The on board equipment (OBE) is smaller than a car radio and sits on the dashboard of the vehicle. It uses smartcard technology and communicates with centrally-held equipment. 50 charging transactions can be stored on the card, in case of a failure in communication. The equipment is connected to the ignition for power and has a lead to an antenna on the roof of the vehicle. The optical recognition system works quite well (about 7% error rate) but is critical with high number of passages (the recovery work is huge).

1.3 How should enforcement operate?

An Automatic Number Plate Recognition (ANPR) system will operate and violators will be fined via an automated system.

1.4 How can privacy be ensured?

In Italy the application of electronic equipment for plate number recognition is already permitted by law. A special decree (DPR 250/99) and specific application rules govern such schemes, including matters of privacy. Literally these rules could be applied only to enforcement, and a public officer should have responsibility for handling the data. The specific case of the use of this equipment for revenue collection has not yet been defined: if it can be linked to the case of enforcement from the technological point of view, then it may be considered to be the same from the privacy point of view.

So a precise protocol for data treatment should be defined in case of a real scale scheme application, according to the following general rules:

- the overall treatment of data must follow the existing rules of Italian laws on privacy
- in the event that a entry ticket is bought before transit toll collection the problem is limited as no trace remains of the transaction after the operations which are necessary for the verification of the right of access
- in the case of the use of a transponder (during toll collection) the problem is avoided as the explicit acceptance by the citizen of the rules of this kind of service allows a simple procedure of report and money collection; in the case of the application of after transit toll collection techniques, some criteria should be adopted such as:
 - not producing detailed reports of transit without specific request;
 - accepting a request to receive detailed reports only by authorised person (the owner of the car or a delegated person);
 - sending reports in a closed envelope, etc.
- in case of the application of a before transit toll collection technique, where the enforcement is foreseen, it should simply be processed as Italian law requires.

1.5 Related Issues

- The money collection process should be organized using a mix of different methods and tools, taking into account the cost-efficiency of the process
- The use of a transponder technology (in process toll collection) offers possibilities for periodic payments directly to a bank account. This could be an important option for frequent users.

2. BRISTOL

2.1 Background

The PRoGRESS demonstration in Bristol is a technology trial testing the effectiveness of MPS equipment and the enforcement issues with ANPR cameras. Bristol City Council is working with the UK National Government to trial technology for the distance based lorry charge (as referred to by the Department for Transport), and, in particular, how this links with an urban charging scheme. Bristol CC is interested in exploring the role of MPS systems in road pricing, as technology in this area is rapidly advancing. The Bristol demonstration will assess the potential for Vehicle Positioning Systems to provide a technical solution for both a national HGV charging scheme and a local city centre charging scheme.

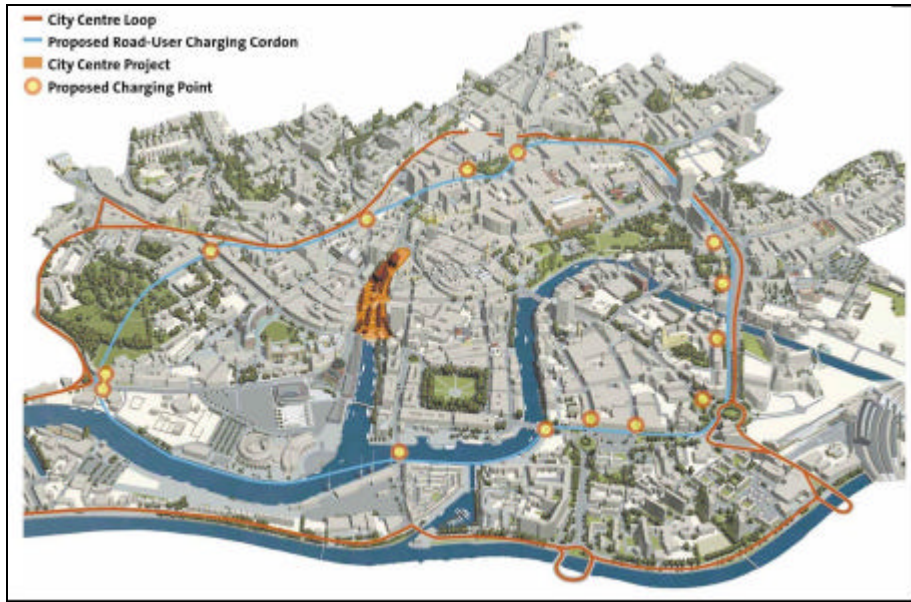
The objectives of the demonstration are to:

- Integrate a national scheme with a local cordon
- Assess the technologies available
- Identify and address enforcement issues
- Assess user acceptance

2.2 How will users be charged?

The Bristol scheme will involve an electronic cordon charging scheme with inbound charging during the morning peak period from 7.30am to 10am. An initial charge level of £1 per vehicle per cordon crossing made in the charging period is proposed, rising to £5 (with a shoulder peak charge of £2.50 in the half hour periods before and after) within 10 years of scheme implementation. The only exemptions to the charge will be for public buses, motorcycles, vehicles registered to disabled people and emergency service vehicles. The proposed cordon is shown in Figure 1 on the next page.

Figure 1: Proposed Road User Charging Cordon



2.3 On Board Equipment

The MPS equipment to be trialled is being provided by Vodafone; Vodafone were one of the bidders for the German system. The on board equipment (OBE), which is smaller than a car radio, will be fitted to the dashboard of the volunteer vehicle. It will be connected to a power source, ideally through the ignition and it will have a lead to an antenna which will be mounted on the roof of the vehicle using a magnetic footprint. The OBE communicates with the central equipment by sending the charging transactions. The maximum number of unsent transactions stored on the smartcard, should communications fail, is 50.

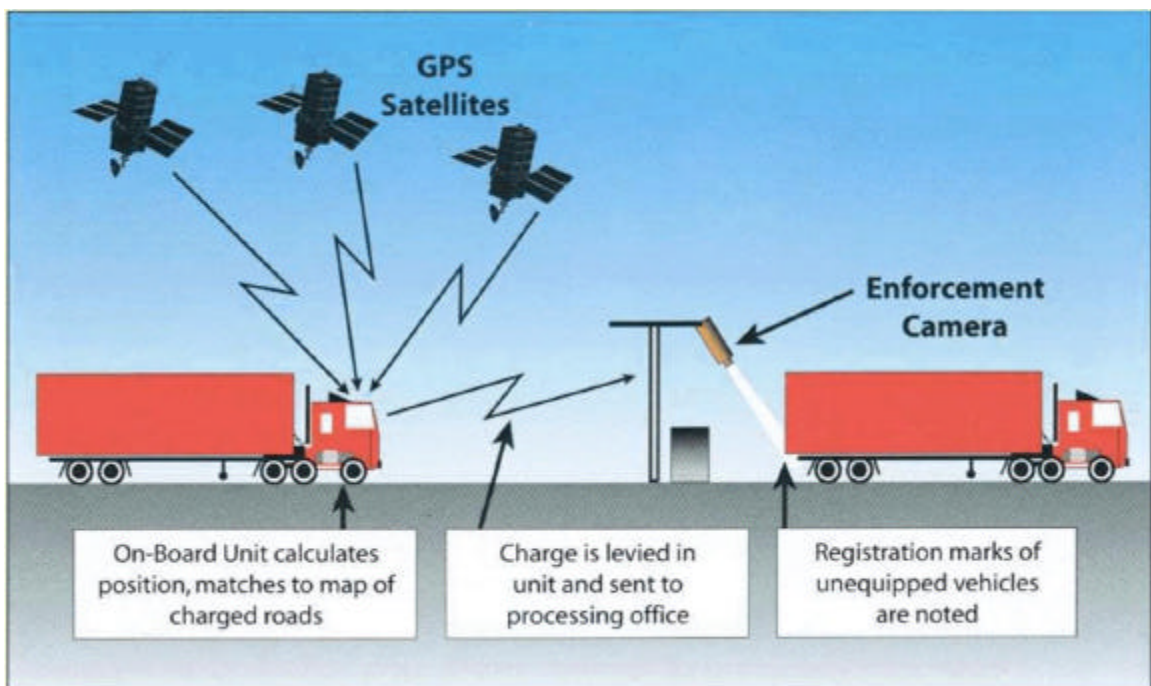
Figure 2: On Board Equipment



2.4 How Will Enforcement Operate?

Vehicles will be fitted with on board units which will be tracked by GPS satellites. When the vehicle passes the cordon points a charge will be levied. The vehicle will also then be picked up on the ANPR cameras and enforcement photos will be taken of their number plates. The ANPR data will then be used as a tool to verify the GPS data. The technology to be used is shown in Figure 3.

Figure 3: Diagram of Enforcement Technology



2.5 How Will Privacy be Ensured?

The Bristol trial concentrates on the feasibility of the technology rather than on behavioural issues which have already been studied. The trial imposes charges at peak hours with varying charge levels according to the time of day. Vehicle exemptions are based on the London scheme.

The MPS equipment has the ability to charge using 3 different methods:

(i) *Corridors* – this will investigate distance based charging with volunteers travelling on the main access routes into Bristol being charged. Please see the main roads into Bristol marked on the map above in blue.

(ii) *Zones* - Zones will be used to define the city centre scheme. The zone will be defined by up to 100 charge points. There will be two cordons, an inner and an outer one with a distance of 200 metres between them. The vehicle will only be charged once it has passed both the outer and then the inner cordon. Although GPS equipment can have an accuracy reading of 10 metres the distance of 200 metres was chosen to be on the safe side.

(iii) *Virtual Gantries* – this method will be used on the charging entry points to assess the number of vehicles who use each of these gateways. The results will be disseminated to help policy development of the preferred scheme for Bristol, as the planned cordon and entry points are the same.

Bristol is looking at using fixed cameras at 3 sites and mobile units for the more strategic routes.

2.6 Related Issues

The demonstration in Bristol will run for a 3-month period from September through to November 2003. The commercial volunteer recruitment took place in May and June, with the equipment being installed in June and July, and testing of the equipment taking place in August. The results of the trial will be evaluated in December 2003 and January 2004 and dissemination will take place after this time.

Bristol City Council is working with the Department for Transport as part of the DIRECTS trial and therefore will be charging volunteers who not only drive into the city centre cordon of Bristol but who also use the surrounding motorway network as part of long distance journeys.

The vehicles recruited for the trial will be commercial, ranging in size from cars through to light goods vehicles and heavy goods vehicles. Bristol City Council will also be working with DVLA for the ANPR enforcement.

- Extension of GPS element
- 50 vehicles equipped

- Commercial fleet vehicles (car, LGV, HGV)
- Scenarios defined by time and location

3. Rapporteur's Summary

3.1 How should road users be charged?

The general consensus was that the choice of charging system is very much dependent on the physical nature of the city and the design of the charging scheme. No one system is more suitable than another, each city has different characteristics and most choose the system which seems to suit that city most. It may be wise to stick to a system with which road users are already familiar. For example per kilometre road charging is already used on German motorways, a similar system could be used for urban road pricing. In Sweden, there are many entries to high speed roads – it may be more difficult to apply road pricing in these circumstances.

It was felt that the free market can be left to solve the more detailed technical charging technology design issues, as there will be a demand from manufacturers to develop the technology for profit. In some countries, Italy for example, a network of lottery ticket machines in shops across the country provides a potential vending source for road user charging permits. Such co-operation between public and private sectors could reduce costs and positively raise the profile of road user charging.

The use of a conventional tax charging was felt to be useful for non-residents who may be unfamiliar with local payment mechanisms. The experience in the Genoa trial has reinforced the need for good information as there was some confusion about the charging trial amongst residents and participants. Manufacturers are likely to resist the mounting of boxes on buses for road pricing as it complicates design. Marco Mastretta suggested that the authorities involved in road pricing administration were keen to keep the role for the driver in charging as passive as possible.

National governments are now talking to each other about interoperability issues for HGVs.

Supplementary questions were developed for future discussion:

- *Should road users be charged at a specific point or continuously?*
- *What is the best technology to use?*

3.2 How should enforcement operate?

The emphasis should not be on enforcement as this implies that non-payment is a criminal activity. Instead, dealing with non-payment should be referred to as “exception handling” which becomes “enforcement” only after a specific time period has elapsed. Only refusal to pay requires enforcement, drivers who forget to pay need to be dealt with using exception

handling. In Nordic countries, a 48 hour period of grace is allowed for payment for those who forget to pay.

There needs to be clear indication to drivers who have passed the road charging boundary that they should have paid the fee before crossing. Perhaps when the scheme is newly implemented, the first offenders could be notified but not charged.

It was suggested that a 48 hour gap should be left for violators to pay before they are fined. This was thought to be particularly important when the road pricing scheme is newly implemented and positive publicity is important and yet can easily be jeopardised by, for example, erroneous charging of exempt vehicles. There needs to be flexibility before and after payment with fines imposed only after an appropriate period of grace.

There was thought to be a strong psychological resistance to the satellite tracking of citizens, even if enforcement technology could be set up to minimise the capabilities of satellite tracking systems by restricting the range.

Supplementary questions were developed for future discussion:

- *Should enforcement be part of a payment system or totally separate?*

3.3 How can Privacy be ensured?

Privacy is less of an issue for the public than it is for the media and for politicians. The public already widely accepts the use of CCTV in the urban environment and it was felt that the use of cameras for enforcement of RP would be accepted.

It may be that the public is not aware of the capabilities of some of the systems used in modern life such as the ability of mobile phones and credit card transactions to track people's movements. According to a Danish focus group conducted in the Copenhagen CUPID project, the public are already aware that systems can track their movements but this does not unduly concern them.

PART II: THE RESULTS OF CONSULTATION

EDINBURGH (DAVID BURNS) TRONDHEIM (TORE LANGMYHR)

4. Edinburgh

4.1 Background:

The primary objectives of the scheme are to:

- to reduce congestion; and
- to reduce through traffic.

With the secondary objectives being:

- to improve the environment; and
- to improve transport infrastructure.

A survey in 1999 on transport policy principles focussed on 3 key questions:

- (1) Would you support congestion charging?
- (2) Would you support a workplace parking levy?
- (3) Would you leave it all alone?

The results of this fed into the Local Transport Plan in 2000/1. Then market research (as opposed to consultation), based on leaflets and questionnaires, was used to consult on the details. The proposed scheme involved:

- a single charge per day for the first inbound movement;
- operating charges for Monday to Friday only; and
- exemptions for emergency vehicles, buses and disabled badge-holders

The responses were found to vary by:

- where respondents lived;
- whether or not the household had access to a car; and
- whether the respondent was a business or private traveller.

4.2 Who should be charged?

In principle, everyone should be charged as all vehicles contribute to congestion. In practice, some specific exemptions are necessary. Exemptions have been agreed as above (i.e. covering emergency vehicles, buses and disabled badge-holders). Emergency vehicles are taken to include police, ambulance and fire service vehicles. Other essential services, such as gas and various council vehicles are not included. Taxis will be charged, as there was considered to be

no sound justification for exemption and, on the practical side, there could be difficulties associated with the differences between traditional “black cabs” and private hire vehicles.

Other groups have expressed the view that they should be exempt too, so extra work is being carried out to find ways to appease these groups (e.g. via transport improvements funded from revenue). The groups concerned include city retailers who require deliveries and/or rely on car based customers and other sectors of the business community. However, a £2 charge is obviously almost insignificant compared to the value of a wagon full of goods!

Another group which has argued for an exemption is the army; Edinburgh Castle is still an operational military base. However, their request for exemption has been declined.

There are no exemptions for politicians and others associated with the Scottish Parliament.

4.3 Where should charges be applied?

Edinburgh has investigated 2 options: a city centre cordon and a city centre cordon supplemented by an outer cordon. Overall, the second 2 cordon option is most popular, but opinion is divided dependent on where respondents live. Those living outside the outer cordon (and thus outside Edinburgh) tend to prefer the single cordon option.

4.4 When should charges be applied?

The original plan was to charge from 7am to 7pm, Monday to Friday, on both cordons. Currently a modification is being considered, whereby the charge on the inner cordon would be 7am to 7pm and that for the outer cordon would operate just during the peaks. Turning the charge off during evenings is considered necessary to avoid damaging the leisure industry.

4.5 How much should be charged?

A charge level of £2 (3.5 Euros) has been agreed throughout. Higher charges were considered to be detrimental to business and likely to provide too much revenue to spend on transport projects, while lower charges were considered insignificant.

4.6 How should revenue be used?

The Transport Scotland Act states that revenue can only be used to fund transport infrastructure projects. A political commitment has been given that this investment will be additional to that already provided for transport from other sources. However, in London, it is thought that grants for transport projects may be reduced as a result of the availability of charge revenue and Scotland has previously been very successful in bidding for funds to support transport projects. So, it is assumed that, at the very least, bidding for external funds may become more difficult if charges are introduced.

4.7 Related issues:

Public consultation is an obligation in the UK. The Edinburgh consultation has involved all local authorities within the “travel to work area”. Two local authorities outside Edinburgh with residents of predominantly lower socio-economic status are completely against charging, because many among their electorate work within the city.

The scheme proposals have been informed and influenced by surveying opinions and through discussions involving the public and various interest groups, but there has been no formal feedback. However, many questions about equity and fairness have been addressed and the process has been unique because people have genuinely had a say and the details of the charging process and investment package have been modified as a result.

It is important to provide the right level of information: there needs to be enough to demonstrate the benefits of various options, but not so much as to be boring. Consultation in Edinburgh has taken place gradually over 4 years.

There has been some concern that too much consultation may be taking place in the UK and that charging may, therefore, be being treated differently to other transport issues. Also, Edinburgh is committed to securing approval through a referendum before a charging scheme is introduced. Legally, this can only be carried out by Edinburgh City Council involving residents from within their administrative boundary. This is a problem, as not all those affected can be represented.

The final decision on charging will be dependent on political decisions as well as the work undertaken by transport specialists. A significant part of the consultation process is about dissemination and promotion of the scheme. Consultation may help politicians to move towards implementation, but the key may be the election cycle and the fact that there is to be a referendum.

The Scottish Parliament has effectively given approval to the principle of charging through the Transport Scotland Act and there is a formal, 2-stage approval process for specific schemes.

Ideally, as many transport improvements as possible should be implemented before charging is introduced, but this may not be very likely / easy to achieve before the revenue is available to cover the costs.

5. Trondheim

5.1 Background:

The latest round of survey feedback is not available yet, so the information provided here dates from the 1990s.

5.2 Who should be charged?

Everyone and there is a need to not be too lenient on exemptions. It may be necessary to exempt 2-wheeled vehicles for technical reasons and there may also be arguments to exempt electric cars.

The incidence of charging on different types of people is also a significant issue. This relates to the geographic design of the charging system (covered in section 5.3).

5.3 Where should charges be applied?

The original toll ring did not cover the whole city, so a scheme was introduced in 1998 for a zonal system to address this. In any system design, it is important to avoid dividing areas of the city with significant levels of internal transportation (e.g. for shopping and school trips etc) to create coherent zones.

The zonal system includes 8 zones. The change from the original toll ring to zones has implied a big shift in how people are affected by charges. Couples without children used to pay 50% of the total revenue, but now pay only 20%. Now, it tends to weigh most heavily on families with children (who pay 50%+), because they tend to live in the outer areas but need to go to the centre for work, etc. So some people consider that there is a bias against families. There is also a feeling that it may be unfair on people who live alone, as their contribution has doubled. The overall revenue from the zonal system is much higher, so the redistribution effect is exacerbated for those charged more.

A further extension to the charging system is to be implemented in the autumn of 2003, with an additional charge levied across a cordon around the city centre.

5.4 When should charges be applied?

The original scheme operated from 6am to 5pm, in order to avoid interference with trips that involved taking children to evening activities. The zonal system proposed in 1998 operated from 6am to 6pm. A time differentiated charge was also included with a small increase during the peaks to encourage greater use of public transport at those times, but it was not considered successful.

5.5 How much should be charged?

Charges were derived from modelling work, based on the need to recoup the costs of capital investment. In 1994, it was agreed that “environmental pricing” should be tested and in 1999 it was accepted that “road pricing” (i.e. charges for demand management purposes) could be a way forward after the financial reasons for the original tolls expired. Models have shown that a charge of 1.3 Euros for through trips would give the best relative benefit and reduce such trips by 25% (they currently account for 40% of all trips). The argument against this is that cars are forced to divert around the area, causing an increase in distance travelled. However,

there has been no political support for charges for demand management purposes in the run up to elections, so this has yet to be tested.

5.6 How should revenue be used?

Revenue has been put towards the “Trondheim Package”. This is mainly a road building programme, most of which has now been carried out

Surveys from 1994 highlighted the public view on revenue use. The transfer of revenue to “other sectors” beyond transport was clearly not acceptable. The most popular use of revenue was public transport, followed by safety. After that, using revenue for new transport infrastructure, improving existing roads and enhancing the city environment were equally popular. This demonstrates that car users can accept the idea that revenues collected from them may be spent on public transport, an option which Trondheim may not have considered often enough.

5.7 Related issues:

The surveys suggested that most people considered it fair to pay for quantity of road use rather than for traffic conditions. This could be seen to have implications for where and when charges are applied. Also, more than 20% expressed the view that taxation rather than direct charging was the most appropriate mechanism. However, consultation was rather less extensive in the area of where to charge than on the other questions, because there was less flexibility surrounding feasible charging locations.

The political commitment has always been to remove the scheme in 2005, once the costs of the capital investment have been recouped. This may happen, but it is unlikely that the infrastructure will be taken away, so the possibility for reintroduction should remain. Experience has shown that charging road users is an efficient way to collect taxes, so it may be attractive to politicians. Also, models show that removing tolls might result in a shift back towards traditional peaks, potentially worsening conditions. However, the expectation is that there would only be a small rise in overall traffic levels. Trondheim used to suffer from congestion, but the road building undertaken through the package has removed it and the potential for increasing demand may not be sufficient to cause it again within the foreseeable future.

6. Rapporteur’s Summary

6.1 Who should be charged?

The overriding principle seems to be that everyone should be charged, because all vehicles contribute to congestion and all travellers should benefit from the expenditure of revenues.

Standard exemptions need to be applied to cover emergency vehicles, buses and the disabled. However, other groups who may expect to be exempt (e.g. taxis) may not justify it.

It was noticeable that those groups most prominent in arguing for exemptions tended to be from the business community rather than representative of social concerns and this may suggest that schemes could be biased against those least able to represent themselves if such lobbying is allowed to succeed.

6.2 Where should charges be applied?

In Edinburgh, a very careful consultation process has taken place in an effort to get the details of where to charge right, resulting in 2 cordons being the most preferred option. However, views clearly vary dependent upon where people live and so the option most supported may be as much a function of geography as consultation.

In Trondheim, there has been a focus on avoiding division of coherent areas (e.g. containing homes, shops and schools) to prevent charging having a negative impact on people's lives.

The general theme in making location decisions about charging appears to be perceived fairness, with geographic equity and avoiding disruption of existing activity patterns being key elements.

6.3 When should charges be applied?

All day, possibly with a peak differential.

Both Trondheim and Edinburgh rejected evening charges in order not to discourage evening activities. This suggests a general principle of distinguishing between times when charges need to be applied to deliver the desired objectives (regardless of whether the focus is reducing congestion or providing revenue for transport improvements) and times when the social and economic benefits of free travel are more important.

6.4 How much should be charged?

This is a hard question to answer on the basis of these two case studies. The charge level seems to be primarily a political decision and rather remote from the consultation process. Indeed, the decision may well have been taken before consultation occurs.

The motivation for deciding charge level appears to be striking the right balance between acceptability and effectiveness.

Although the explicit objectives of the two schemes is different (Trondheim has always been interested in revenue generation, while Edinburgh's scheme is primarily about cutting congestion), practical budgeting approaches mean that the amount of revenue that the scheme will deliver and what that can pay for are important considerations in both cases.

6.5 How should revenue be used?

In the UK, revenue use is totally limited by law to funding transport infrastructure. In Trondheim, funding transport infrastructure was the main reason for considering pricing. So, in practice, the situations may not be dissimilar (although the details of the infrastructure projects may be).

In both cases, consultation shows that there is most support for using revenue to fund better public transport (in particular) and better transport (in general).

Equally, in both cases, consultation shows that transferring revenue outside the transport sector is very unpopular. This suggests that the traditional economic view that revenues from charging should be recycled through lower labour taxes may be hard to justify on acceptability grounds.

Some key dimensions related to the use of revenue are:

- (i) the geographic comparisons between who pays most and where the money is spent, which may be particularly critical where travellers come from more than one administrative area; and
- (ii) the interactions between different government levels that may mean increased funding from charging at local level results in decreased financial support for transport projects filtering down from national level.

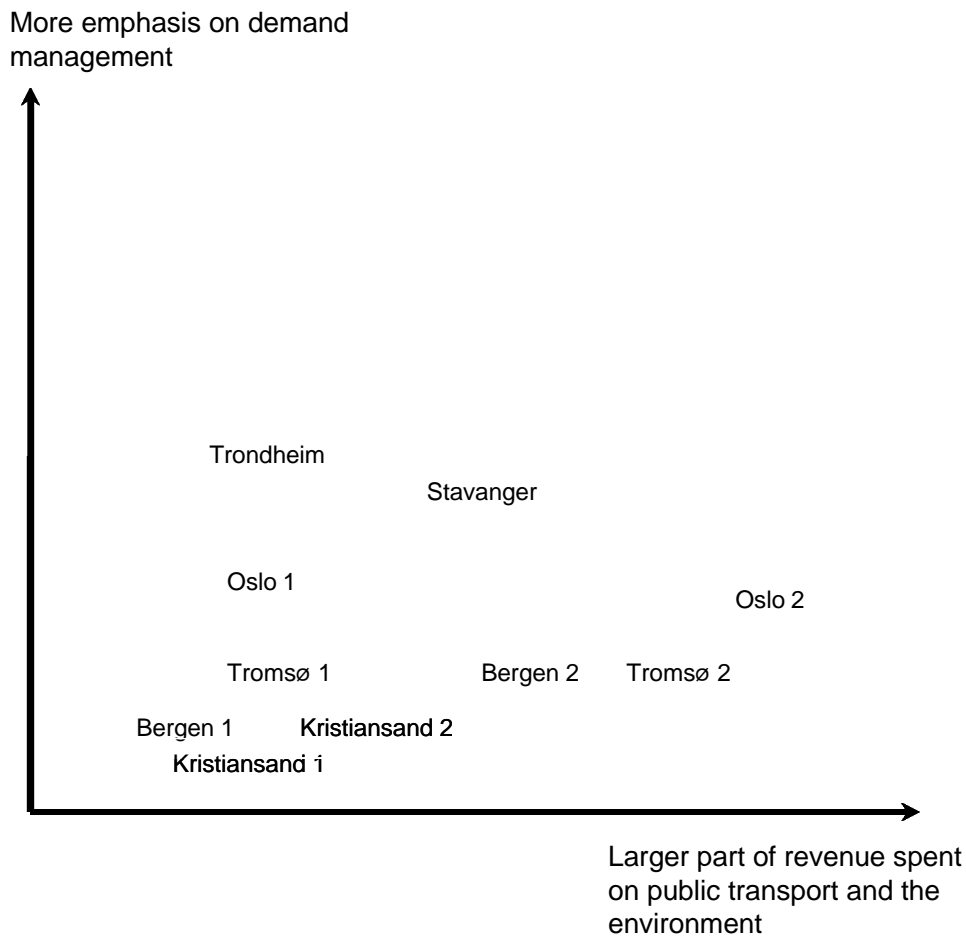
In general, the use of revenue requires very careful design and consideration during the consultation process, because it is an important part of securing overall acceptability for charging.

PART III: LESSONS FROM THE NORWEGIAN ROAD PRICING SCHEMES

Dr. ing. Tore Langmyhr from the City of Trondheim, Planning and Building Department in Norway presented the result of his research into Norwegian road pricing schemes.

The diagram below illustrates the focus of various Norwegian towns and cities and the emphasis which they place on road pricing.

Figure 1 Norwegian road pricing schemes: Two dimensions



Problem framing and goal formulation:

Cities need to ask “Why road pricing?”. In particular, the reasons for implementing a road pricing scheme must be defined. These include;

- Congestion and/or adverse environmental effects of car use widely regarded as serious problems
- Local bottlenecks without feasible alternative routes
- Insufficient funds for transport investments

Defining “an adequate road network”

To define an adequate road network, there are feasibility studies discussing the principle of user charging and different charging systems:

- project related tolls
- toll rings
- annual licence fees
- local or regional petrol fees

Understanding the process

Road pricing implementation requires numerous controversial decisions:

- the principle issue of user charging
- the use of revenues
- agreements concerning state funds
- type of charging system
- location of toll stations
- the pricing regime

Each decision provides an opportunity for opponents to put forward a range of arguments against the scheme.

Road pricing innovations need “nourishment” to gain strength!

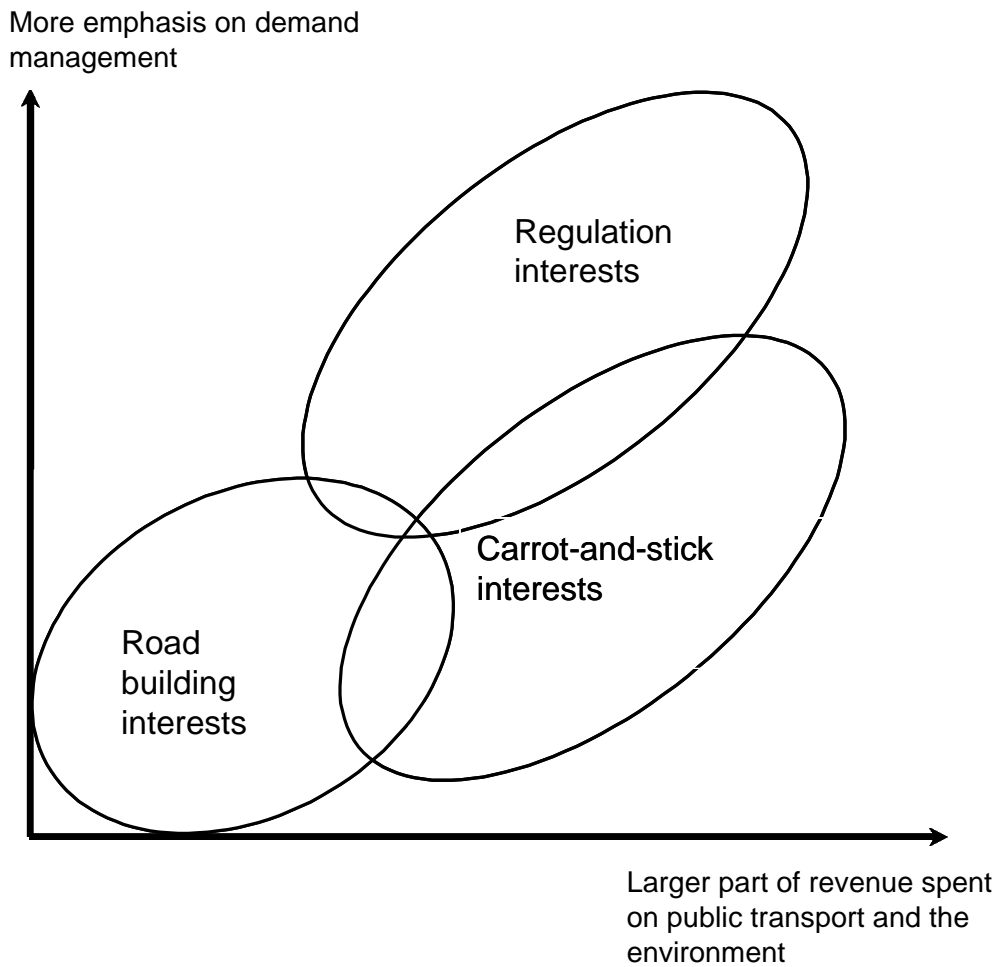
Public and political acceptance

Successful implementation has rested on close co-operation between the County Roads Offices and influential local politicians. The County Roads Offices had a great influence on the composition of the investment packages, as well as on the information campaigns promoting the charging schemes. The timing of proposals takes into account the timing of local elections. Public acceptance is not likely, but political acceptance is possible!

Interests overlap, so that several compromises are possible, especially if the rules for disposal of revenue open up for flexibility and the compensation of losers. The scheme must be flexible enough to adjust to shifting political preferences.

There are three political “areas of preference” concerning road pricing which are shown in Figure 2

Figure 2 Three political “areas of preference” concerning road pricing



The following objectives underlie the establishment of the toll ring:

- Fund raising to improve the transport system
- Traffic demand management; influencing mode choice and trip timing

- The avoidance of adverse secondary effects"

City-specific factors easing acceptance

- Clear demarcation of urban settlement
- Few major arterials
- Long distance to “rival” cities
- The city lies within one administrative unit
- Great need for extra investment funds

The “most needed” schemes may be interpreted as providing both mobility and environmental improvements.

After implementation

The prospect of extraordinary state funds supported the schemes. However, a suspicion that ordinary funds have been reduced after the introduction of user fees has weakened local political support.

Even if opposition to some of the schemes were reduced after implementation, road user charging is still very controversial.

Minor “irregularities” in a scheme may attract much attention in the media and jeopardise the credibility of the system. In the second-generation road pricing system in Trondheim (1998), much opposition and negative media coverage could be avoided if more practical arrangements were made for manual payment.

Investments in charging technology may increase the possibilities for continued road pricing.

Main lessons learned

Even if the Norwegian experience does not represent “real” congestion pricing, some demand management effects may be achieved even if the official main rationale is fund raising.

The idea of marginal cost pricing is difficult to propagate as a primary policy goal. Therefore, road pricing implementation is probably most likely to succeed when starting with crude systems that may be developed and refined.

The processes of implementation typically have lasted for 5-10 years. It has been necessary to change the scheme designs according to political preferences, as well as some stakeholder objections.

Most cities are aiming for new charging schemes and new investment packages. This is seen as a sign of success.