

# Innovative Demand Management Strategies Road Pricing Schemes



*Policy notes*

# What is it about?

## Characteristics

Road congestion has become one of the most pressing local issues in cities around the world and many developments have been made in road user charging schemes.

These schemes:

- aim at benefiting the urban transport system as a whole, particularly where revenues collected are reinvested into the local transport system;
- provide a good incentive to reduce car-use and consider alternative modes of transport;
- can take different forms ranging from variable tolls in corridors or single roads to a complete congestion charging scheme.

## Example: Congestion charging scheme in London (UK)

Congestion charging was successfully introduced in central London in February 2003. It contributes to achieving four transport policies: reduction of congestion, improvement of bus services, improvement in journey time reliability and a better distribution of goods and services.

Concretely, reduction of congestion has been maintained at an average level of 30%. Ongoing improvements to the bus network continue to bring benefits and quality of life has improved and is acknowledged. London also succeeded in reducing road traffic accidents within the charging zone and on the boundary route. A 12% reduction in emissions of key traffic pollutants has also been achieved.



**London Congestion Charging Scheme**

Photo: Transport for London

## Key benefits

In a market economy, such pricing schemes can play an important function. They...

- act as signals to consumers about the real costs associated with particular goods or services;
- generate revenues that can be allocated to improve the overall transport system, encouraging a better modal balance;
- reduce traffic congestion and volumes in metropolitan areas and create a better quality of life;
- use robust technologies to ease commuting and ensure road safety;
- contribute to an efficient distribution of goods and services.

## Is this something for us?

Research shows that this concept is likely to be implemented over time by more local authorities. It is a necessary step as simply providing new road capacity and/or new public transport capacity is not enough to turn the negative trend of increasing shares of car travel and decreasing shares of public transport travel in cities.

Key conditions for implementation are:

- Favourable legal framework and taxation system;
- Political support and champion;
- Clear plan on revenue use;
- Availability of alternative modes of transport.



**Stockholm Congestion Charging Scheme Trial**

Photo: Oskar Alarik

«The Congestion Charge continues to be highly effective in decreasing congestion in the Capital. Traffic levels and associated carbon emissions have been cut, bus services have improved, the roads are safer, and London's air quality has improved thanks to reduced vehicle emissions. The Congestion Charge provides vital funds which are invested back into London's transport system, and into encouraging walking, cycling and greater use of public transport. Cities from across the world can look to our scheme as a benchmark for how to tackle the economic and social problems associated with congestion.»

**Ken Livingstone, Mayor of London**

## Check list

<b>City size</b>	Medium to big cities ( > 200,000 inhabitants).
<b>Costs</b>	<p>Local authorities should foresee a budget for:</p> <ul style="list-style-type: none"><li>● Research, modeling, consultation, information campaigns;</li><li>● Equipment costs (camera, tool booths etc);</li><li>● Operating costs (call centre enquiries, staff costs etc);</li><li>● PT improvement expenses.</li></ul>
<b>Implementation time</b>	The elaboration of a pricing scheme takes some time but the impact on congestion should be noticeable quickly after launch. It may take a longer time for total benefits to outweigh total costs.
<b>Stakeholders involved</b>	<ul style="list-style-type: none"><li>● National government;</li><li>● Regional/local government;</li><li>● Transport authority;</li><li>● Planning authority;</li><li>● Transport operators;</li><li>● Emergency services.</li></ul>
<b>Undesirable secondary effects</b>	Social exclusion could become problematic if the pricing scheme is not designed correctly.

# Benefits & Costs

## Benefits

Pricing schemes that steer and manage transport demand such as the congestion charging, can have a major impact on modal shift as well as on other key local issues:

- **Reduction in car traffic to and from the congestion area:** Both London and Stockholm have experienced a significant decrease in car traffic leading to improved journey time reliability.
- **Contribute to a better balanced modal split:** Thanks to investments in transport infrastructure made possible with the revenues collected through the scheme, other transport modes become more popular, enabling a more balanced modal split to be achieved.
- **Encourage the use/purchase of cleaner vehicles:** The proportion of clean vehicles passing control points more than doubled in Stockholm. This is possible thanks to a fair system of exemptions.
- **Lower emissions and cleaner air:** The reduction in traffic within a defined zone lead to a clear fall in emissions from road traffic (NOx, CO2, and PM).

## Costs

Introducing a pricing scheme is costly mainly due to the operational and maintenance costs of the whole system. These costs range from:

- **Service provision:** provision of transport alternatives to cars, staff training, customer services and database management etc;
- **Infrastructure expenses:** camera, payment and enforcement system etc.

Of course these costs need to be balanced with the revenues collected and the costs related to congestion: travel time unpredictability, environmental damage, loss of productivity etc.

In London, the cost of setting up the scheme was £200m (297m €), with an annual operating cost of about £115m (170m €).

In the first year, the actual net revenue realised was £70m (103m €), projected to rise to about £122m (181m €) in 2005/06. Transport for London's monitoring exercise has shown that congestion in the zone has fallen by 30% while the volume of traffic within the zone is down by 15%.

## Cost-benefit analysis in Stockholm

The Stockholm trial generated positive effects on journey times, the environment and health.

An attempt was made to put a monetary value on these. If it is regarded only as a brief experiment which is now concluded and will not be resumed, the trial was a financial loss. Seven months were insufficient to generate benefits that outweigh the costs of the congestion tax system.

But if the scheme becomes permanent, the net benefit would be approximately SEK 765 million per annum (85m€).

**Stockholm Congestion Charging Scheme Trial**

Photo: Oscar Alarik



# Users & Stakeholders

## Users and target groups

Choosing the right size and design of a pricing scheme is essential. Several alternatives are possible:

- **the corridor approach:** a charged stretch of road that provides a means of transport from one point to another;
- **the area scheme:** charging for driving in an area with a closely integrated road system;
- **national and transnational system:** the charged area extends to a wider road network, rather than an individual zone.

Each scheme involves a different target group that is extended as the zone becomes larger. When building a pricing scheme, it is crucial to identify the users targeted and ensure the fairness of the scheme for all. Indeed, one of the major criticisms of road user pricing is that it is unfair to certain groups of people, ranging from low-income drivers to residents living the charged area.

Although allowing too many exemptions would defeat the object of the scheme, a strategy of exemptions or discounts for certain categories of user is likely to be important for achieving fairness and maintaining support for the scheme.

## Key stakeholders for implementation

It is important to have good governance and effective co-operation between stakeholders.

Key stakeholders might include:

- **National government**, as national legislation to enable road pricing may be required.
- **Regional, local and city government** (depending on the circumstances), prepare policy to permit pricing and which plan and operate the scheme.
- **Transport authority**, takes care of planning the services to enable access to areas affected by the pricing scheme.
- **Planning authority**, develops land-use planning approaches to reinforce pricing.
- **Transport operators**, provide services to enable access to areas affected by the pricing scheme.

Businesses also play a crucial role in the success of the scheme. The impacts of the scheme on the private sector are various and can either be beneficial or costly.

### The central London congestion charge

The London scheme is the largest of its kind in the world. Factors for its success have been the strong political leadership of the Mayor of London as well as a comprehensive consultation process. This process aimed at ensuring that the scheme recognised the concerns of the various stakeholders' groups. Other transport authorities were also brought on board in order to foster partnership and efficient cooperation.

The various user groups were widely consulted as part of an extensive information campaign and were asked their opinion on the key aspects of the scheme such as the discounts, exemptions and charging hours.



**London Congestion Charging Scheme**

Photo: Transport for London



# From concept to reality

## Preparation



The implementation of a road pricing scheme requires a great deal of preparation as early success with the scheme is crucial for a good public acceptance.

### Key aspects at this stage

**(Common) awareness of the problem and a good reason for initiation:** Road pricing is usually a good solution for cities facing increasingly unsustainable traffic conditions. The traffic problems need to be clearly perceived by the general public and other stakeholders. The example of Edinburgh, where a proposal for a congestion charging scheme was defeated in a referendum, could suggest that citizens did not believe that there was a congestion problem in their city or that the proposal would address this problem in a fair or adequate way. The potential benefits (direct and indirect) of a scheme, e.g. demonstrated through modelling, also need to be explained clearly.

**Legal framework and defined approaches to enforcement:** The legal and institutional framework is a key issue for success as it ensures a broad base of support for any scheme. At this stage, the national level is required to set the legal basis for allowing road pricing schemes. Then, the local authority or authorities are responsible for operating the scheme and ensure efficient and fair enforcement procedures for pursuing the resulting fines. Appointed authorities should have the mandate to do the work and the capacity to sustain their responsibilities.

There might also be a need for creating a new policing and penalty administration system dedicated to traffic. It is also important to be aware of the impact of a new scheme on users from other EU Member States and therefore the relationship with EU law (for example on state

aid or free movement of goods/services/people) as well as the challenges involved in enforcement of charges or fines on foreign nationals.

**Make it part of an integrated strategy:** The first part of getting the design right is ensuring that it is part of an integrated transport strategy. An important element is to set up appropriate complementary and alternative transport modes, which are available as soon as the charging scheme begins. If commuters do not find efficient alternatives to cars, they are likely to return to their individual car even if they have to pay for its use, which would undermine the success of and support for the scheme.

**Select the correct perimeter plan and geographic structure for pricing:** A road pricing scheme should ideally be applied on a large scale in order to avoid loopholes and losses of efficiency but it is difficult to put it into practice from the very start. Defining the spatial coverage of the system and the precise locations of charging points is likely to be critical to achieving an efficient outcome. However, some flexibility should be planned to allow for the scheme perimeter to be changed or extended.

**Set the right charge and communicate it well:** The challenge is to set prices that reasonably match demand and supply. The concept underlying road pricing is the economic theory of the 'Marginal Cost Pricing'.

Traffic modelling applications based on local data are needed, as this is difficult to transfer from one place to another due to issues such as scale, level of congestion and local topography. The charge should not be presented as 'just another tax', and therefore it is crucial to make the use of funds acceptable or attractive to people. Fair and efficient pricing are inseparable from each other.

It is however difficult to estimate the exact marginal cost of an action, which requires assessing correctly the interactions of all markets influenced by the choice made (value of time, of human life, of air quality). Moreover, it changes all the time. A single flat rate has the benefit of being easily understood by the user. However it may be that a variable charge (e.g. depending on the time of day, type of vehicle or level of congestion) could be more effective, in which case the technology would have to be able to cope with this and the rates explained to the user.

#### **Recruit an influential champion:**

Successful projects need an influential champion with political and public influence and who can create a sense of inevitability and be pivotal in keeping the project going. He or she will speak up for the project effectively and persistently and will either be the politician responsible for the scheme or closely associated with it.

#### **Consult the public and stakeholders and keep them informed:**

Social acceptance plays a vital role in the feasibility of the implementation of a pricing scheme. Three aspects need to be addressed: social exclusion, economic viability and privacy of the users. Fairness or social equity are key words determining the acceptability of the



**London Congestion Charging Scheme**

Photo: Transport for London

scheme. One precondition to support confidence in the pricing scheme is transparency of the intended measures at an early stage. People want to see themselves as having at least some degree of control over the things they are affected by. Thus there is a connection between participation, commitment, acceptability and subsequent effectiveness.

#### **Ready for implementation?**



**Make sure that a road pricing scheme is the adequate solution to tackle transport related problems in your city**

**Check the legal framework and defined approaches to enforcement**

**Make it part of an integrated strategy**

**Select the correct perimeter**

**Set the right charge and communicate it well**

**Recruit an influential champion**

**Keep the public and stakeholders informed**

## Implementation



Implementing a pricing scheme requires a range of technical infrastructure in order to define the area, to ensure enforcement and facilitate payments. It also requires a good level of co-operation between all actors and some investment to improve or develop transport alternatives to cars.

### Key aspects at this stage

**Ensure a successful debut:** Pricing schemes are often judged based on their initial success. This makes effective management of the launch phase critical for future and long term success. While a launch without major problems will not secure public acceptance, it can nevertheless build trust in the system. All schemes will be subject to criticisms and it is necessary to be able to answer them quickly and be available for customers at all times. Good customer relations must be built at this stage of the process.

**Ensure a high level of public transport and other Mobility Management measures and transport alternatives:** When introducing a new pricing scheme, it is important to provide citizens with other alternative modes of transport so that they can choose the best suited mode for their own travels. While revenues of the scheme will help in the improvement and creation of alternative transport modes after the scheme is in place, it is nevertheless crucial to invest in these alternatives before the launch.

**Secure cooperation from third parties:** The project needs to be supported by government agencies whose permits or cooperation are needed. The project needs to fit their programmes and policies in order to have a fair chance of success. But most importantly, all actors in the scheme need to build a coherent and trustful relationship in order to ensure the success of

the scheme and a certain coherence in transport planning within the city and the charged area. Transparency and teamwork should be emphasised and benefits for all highlighted. The political champion may act to gather and keep all parties together.

#### **Addressing equity and fairness**

**concerns:** One of the major criticisms of road user pricing is that it can be unfair to certain groups of people. One of the best ways to avoid adverse impacts on low and medium income individuals is to use some of the revenues from the pricing scheme to improve public transport. Another option is to provide discounts for certain categories of road users.

#### **Good marketing and communication plan and media support:**

A communication strategy is one of the main pillars of the implementation procedure. Transport pricing has to be communicated as a very effective means to reach commonly shared goals. The communication has to point out the positive sides of the package i.e. the improvements reached thanks to revenues raised. This connection between push and pull measures should be communicated transparently. The marketing campaign should run during the whole project and keep the public and stakeholders informed about the development of the scheme. Media support is also helpful to raise awareness about the new charges, to explain their aims and benefits for each individuals and businesses.



Effective marketing of the scheme linked with a comprehensive communication strategy, enables transport planners and politicians to emphasize both the need for a shift in travel behaviours and the advantages that would result from the scheme in terms of improved environmental conditions, amenities and accessibility to all.

**Use proven technologies:** There is a need for a good and adapted technology as it can have beneficial effects on the implementation process. The technology will differ according to the scheme selected. The local authorities usually seek technological support from a private sector provider who then takes care of placing the components on the roads and sometimes manages the operations.

Congestion charging may involve continuous monitoring of vehicles in order to calculate distance travelled or even more complex indicators of external costs imposed. The technology introduced needs to take into consideration all users - including occasional users for whom special technology systems might be required. Electronic pricing schemes using technologies such as GPS monitoring and smartcard tags enable a wider range of differentiation between the users.

The best is to keep the system simple and use proven technology. A way to significantly increase the risk of failure in a large-scale technical project is to use technologies that have not been commercially proven.



**Stockholm Bus**

Photo: Oscar Alarik

### Marketing plan: 5 step process in London

1. Meetings with key stakeholders and hearings to educate interested parties;
2. Public consultation;
3. Publication of the final transport strategy based on outcome of dialogues with stakeholders and public concerns;
4. Publication of legally binding documentation of the scheme by the transport agency with further consultation;
5. Regular monitoring of impacts after implementation.

## Operation



Pricing schemes have been successfully implemented in cities like London and Singapore. In the long term, such schemes are likely to be taken up by more local authorities as they bring about real improvements in quality of life. The following elements are seen as key in order to ensure a long-term efficiency of the scheme.

### Key aspects at this stage

#### **Clear principles of compliance and enforcement:**

Any compliance strategy will need to reflect the principles of ease of use, ease of understanding, default in compliance, customer service and social inclusion. Enforcement must provide effective sanction against evasion and should be consistent with other infringements and cost-effective.

This is key to success as it contributes to building public support and ensures correct revenues.

#### **Focus on customer relationship management:**

Customer service is one of the major expenses of road pricing schemes.

A sound customer relationship management strategy makes it acceptable and easy for road users to pay the charge. It should be flexible enough to handle all target groups, from daily commuters to occasional road users.

Staff availability and high standards of data entry and record checking to maintain an accurate information throughout the system are key.

This comes with a price but avoids problems with enforcement and keeps the users satisfied.

**Honest reporting of results:** Surveys and monitoring of effectiveness of the scheme must be regularly carried out, not just on the most obvious direct impacts such as congestion and air quality, but on indirect impacts such as patterns of economic activity, consequences for traffic outside the charging area etc. Results of these surveys should be disseminated widely as it is important to communicate the realistic expectations/benefits of the scheme. Reports should be elaborated, honestly reporting on achievements, costs and improvements. A good communication, including broad policy impacts, will ensure public acceptance.

**Maintain flexibility:** It is unlikely that the initial pricing scheme will remain unchanged as it needs to adapt with changing local conditions. Prices might need to be revised, boundaries readjusted, technology upgraded and rules improved.



**Stockholm Congestion Charging Scheme Trial**

Photo: Oskar Alarik

# Further information & contacts

## Further information

### **Urban pricing; from theory to reality**

Publication produced by the EXTR@Web consortium on behalf of DG Energy and Transport.

[http://ec.europa.eu/transport/extra/web/downloadfunction.cfm?docname=200609%2F20060905\\_133346\\_70074\\_Urban\\_pricing.pdf&apptype=application/pdf](http://ec.europa.eu/transport/extra/web/downloadfunction.cfm?docname=200609%2F20060905_133346_70074_Urban_pricing.pdf&apptype=application/pdf) (English)

### **Urban transport pricing in Europe (EU projects)**

Common website of six pricing projects funded by the European Commission under FP6.

[www.transport-pricing.net/](http://www.transport-pricing.net/) (English)

### **CUPID (EU project)**

CUPID developed a comprehensive Evaluation Framework for transport schemes. It guides the reader through the whole monitoring and evaluation process.

[www.transport-pricing.net/cupid.html](http://www.transport-pricing.net/cupid.html) (English)

### **PLUME (EU project)**

PLUME developed a whole report on pricing policies.

[www.lutr.net/index.asp](http://www.lutr.net/index.asp) (English)

### **Deloitte Research, 2003**

Combating Gridlock: how pricing road use can ease congestion, New York (USA)

Email: [delresearch@dc.com](mailto:delresearch@dc.com)

### **Congestion charging in London**

Information available on the Transport for London

[www.cclondon.com](http://www.cclondon.com) (English)

Facts and results from Stockholm Trial

Evaluation reports are available on the Stockholm's

[www.stockholmsforsoket.se](http://www.stockholmsforsoket.se) (English)

### **NICHES - further documents with more details**

Reports on the state of the art, analysis of success factors and barriers for implementation, transferability potential and integrated strategies are available on the NICHES websites (English):

[www.niches-transport.org](http://www.niches-transport.org)

[www.osmose-os.org](http://www.osmose-os.org)

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## The mission of NICHES is:

*to stimulate a wide debate on innovative urban transport and mobility between relevant stakeholders from different sectors and disciplines across Europe.*

*NICHES promotes the most promising new concepts, initiatives and projects, to move them from their current 'niche' position to a 'mainstream' urban transport policy application.*

## NICHES team

The NICHES consortium is composed of a variety of experts in the field of urban transport, ensuring the knowledge of the academic sector (Warsaw University of Technology), the experience of cities (Stockholm), the expertise of consultants (Rupprecht Consult, PTV Planung Transport Verkehr AG) and the multiplier effect of the networks (POLIS, EUROCITIES, CEMR).



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