

Executive Summary

Mobility and Transport

Urban road user charging: enabling experiments in France

03

Urban tolls are often presented as a concrete solution for congestion, the deterioration of the urban environment and the financing of transport policies – problems shared by the majority of European conurbations. However, urban tolls have so far remained the privilege of a few large foreign cities and have not yet been introduced in France.

Nevertheless, the conclusions of the Grenelle de l'Environnement (the French government's environmental round table) in autumn 2007 encourage the development of environmental taxation tools designed to reduce private car use. These conclusions recommend giving local authorities "the power to introduce urban tolls [...] in order to regulate traffic [...] and finance environmentally favourable actions such as public transport". What would be the benefits of allowing French cities to introduce urban tolls? Certu's intention is to propose possible answers to this question, drawing in particular on its experiences as part of the European CURACAO (Coordination of urban user charging organisational issues) project.

This executive summary proposes three main reasons for launching a debate on the introduction of urban tolls in France:

- feedback from experiments in Europe is largely positive and there now exists a pool of knowledge and expertise, accessible to other conurbations wishing to introduce an urban toll system;
- the urban toll is a scalable tool that can be modified to meet specific objectives and can be adapted to local contexts and varying political objectives;
- the introduction of a toll system can encourage the emergence of innovative urban mobility pricing structures.

Urban tolls are still illegal in France...

The term "urban tolls" is widely used but does not necessarily have the same meaning for everyone. A fairly simple definition of "urban tolls" is that the term covers "any form of payment imposed on car drivers wishing to drive in certain sectors of urban zones" (André Lauer, director of Certu in 1997).

More specifically, urban tolls are tools that form part of a car journey pricing policies. This definition covers a range of previous measures including urban tolls, paid parking policies, infrastructure tolls and other such projects (eco-licences, etc.). The toll will require the car driver to pay the real cost of his or her journey. As well as paying for fuel, vehicle maintenance and other existing costs (insurance, etc.), the car driver also pays a

financial compensation for the negative impacts (congestion, pollution, noise, greenhouse gases, etc.) caused by using the private car as transport means. The potential benefits of urban toll systems are well known: reduced congestion, a deterrent to car use, collective financing of public transport, etc. To date, the only toll systems authorised under French law are infrastructure tolls for tunnels, viaducts and other major structures (except for motorway networks). The purpose of these tolls is to finance the infrastructure in question. It would currently be impossible to introduce an urban toll such as those seen in Stockholm or London in France. There have been attempts to make urban tolls legal, but none of the proposed amendments to existing legislation has ever been accepted.



What lessons can French cities learn from the experiences abroad?

Despite a multitude of existing literature on urban tolls, concrete examples of such systems are still rare. The first anti-congestion urban toll was introduced in the city-state of Singapore in 1975, followed by the toll ring in Bergen (Norway) in 1986, after which other Norwegian cities followed suit. Numerous local authorities have launched consultation processes to study this form of specific pricing. However, the only genuine, recent examples to appear in Europe are the toll systems in London and Stockholm, although Milan has had an urban toll in place for several months and there are plans for similar schemes in Newcastle upon Tyne, Manchester and Birmingham.

The London toll: a successful political gamble... until 2008

The toll zone was introduced on 17th February 2003 and covers London's central business district, a total of 21 km². The zone represents 1.5% of Greater London's total area, 5.3% of its population, but 26% of the conurbation's jobs. The price of £8 (in force since 1 March 2006) applies from 7.00 a.m. to 6.30 p.m., Monday to Friday, excluding weekends and bank holidays. Payment must be made on the same day, either by post, by SMS, online or at a number of retail outlets (newsagents, petrol filling stations, etc.). Electric and hybrid cars and taxis are fully exempt from the scheme. According to the regular results published by Transport for London (TfL), the organising body behind London transport, the overall experience is a positive one. Emissions and congestion in the centre of the UK's capital city have been reduced, providing genuine justification for the toll system. The high price has dissuaded many drivers from using their cars and many of these drivers have turned to public transport, which

has seen an increase in passenger numbers. The number of passengers entering the zone by bus has increased by more than 30% since the toll was introduced. However, the income generated by the toll is lower than expected. The high cost of the system (over £100m per year to operate) and the reduction in traffic go some way to explaining why the financial return is below forecasts. The Mayor of London, Ken Livingstone, who made the toll system one of his political priorities, was re-elected in 2004 in part due to the success of London's urban toll.

In addition, he introduced a proposal to extend the toll zone to western areas of the city. The project came to fruition in February 2007, covering an area of 17 km², taking the total area covered to 38 km². This represented an increase in the toll zone of 81.2%. This extension of the zone was not universally welcomed. It was less widely accepted by London's population than the original toll zone had been in 2003. Furthermore, according to TfL, the extension was likely to increase the number of city-centre traffic jams by 5%. The residents of the western zone, part of the toll zone since February 2007, were given a 90% discount against the toll charge. This situation may encourage these residents to drive their cars into the city more frequently than before the extension, when they were among those financing the scheme by entering the toll zone. It may also cause a reduction in income from the toll. Is the extension of the toll zone viable in the medium to long term? Ken Livingstone, seeking election as Mayor of London for the third time, was recently defeated by Conservative candidate Boris Johnson, who was appointed as mayor on 3rd May 2008. The new mayor plans to improve the safety of public transport and to modify the urban toll system in London without doing away with it altogether.

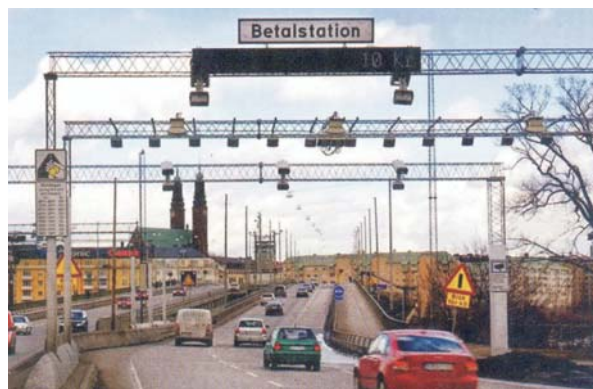
The London toll
Source: Wikipedia



The Stockholm toll: the combination of experimentation and public consultation

The toll zone covers an area of 35 km², representing 280,000 residents out of a total of 780,000 in the Swedish capital. Vehicles are charged automatically by number-plate recognition cameras. The toll zone is surrounded by 18 checkpoints. There is no interruption to the flow of traffic because cars are not required to stop or move more slowly through the checkpoints. The charge is levied against the owner of the vehicle rather than the driver and payment must be made within 14 days of passing through a checkpoint. Following the introduction of the toll, traffic waiting times have reduced by 30% to 50%. According to socio-economic reports, professionals are the main beneficiaries of this travel time reduction time. The reduction in traffic has caused a drop of 10% to 14% in harmful emissions within the toll zone. Bus journey times have shortened slightly and the frequency of public transport has increased by 6%.

The Stockholm urban toll is characterised by two particular features. It is the result of a unique public consultation process, which involved a referendum followed by an experimental phase between 3rd January and 31st July 2006.



The Stockholm toll.

The Stockholm toll was also designed with several objectives in mind: to reduce traffic on the busiest roads by 10% to 15%, to improve the flow of traffic in general and to reduce harmful CO₂ emissions while improving the quality of the urban environment. Following the trial period, on 17th September 2006, there was a referendum in which the majority of residents (53%) voted in favour of applying the system permanently. It is important to note, however, that only city-centre residents took part in the vote. Informal consultations showed opposition to the scheme among residents of the outer areas of the city

Urban tolls: a tool for reducing traffic and emissions

These first experiments have provided fairly conclusive results in terms of traffic reduction, measured in vehicle kilometres. In Stockholm, with its toll ring system, there has been a 20% to 25% reduction in traffic passing through the checkpoints, a 10% to 15% reduction within the toll zone itself and a slight increase outside the toll zone. In London, with its toll zone system, traffic has fallen by 15% and there has been a minimal increase in traffic outside the zone. These reductions automatically mean a fall in harmful emissions within the toll zones. However, given the relatively recent introduction of these schemes, data relating to traffic in extended zones (urban areas), external traffic and the long-term effects of these schemes are not yet available. Furthermore, it is often difficult to isolate the specific effects caused by the toll system from those caused by the many other measures that exist alongside the toll (improved public transport, limited parking spaces, etc.) and those caused by external phenomena (petrol price rises, etc.). Also, due again to the recent introduction of the schemes, little data is available about possible changes in mobility behaviour and changes in the location of households or activities, and it is not therefore possible to predict any long-term consequences. However effective these schemes turn out to be, urban tolls cannot claim to be the sole answer to questions of urban mobility management. As with other all other urban transport policy measures, toll systems must be assessed as one component of a global, conurbation-wide strategy.

CURACAO: a European project for cities "tempted" by a road user charging scheme

<http://www.curacaoproject.eu/>



CURACAO was officially launched on 1st April 2006. Its objective is to increase the use of urban transport pricing schemes in European countries. The authorities interested in introducing these pricing policies are often unprepared at the implementation stage. The work carried out as part of these projects often throws up obstacles to installing the toll system itself. The CURACAO project is financed by the European Commission as part of the 6th Research and Development Framework Programme (FP6) and should be completed in 2009. It may be extended according to the needs of cities introduced to the concept of urban tolls, and if the situation in Europe allows it.

What are the obstacles to introducing a toll scheme?

In May 2006, 43 European cities and regions interested in urban car journey pricing were selected then questioned by CURACAO's partners.

Partners of the CURACAO project

The CURACAO consortium includes partners from all countries and from various professional backgrounds. The group's work is coordinated by a British consultancy (Transport and Travel Research Ltd).

The group is made up of transport experts:

- Goudappel Coffeng;
- ISIS (Italy);
- WSP (Sweden);
- City Agencies (ATAC Roma, TIE Edinburgh);
- city councils (Bristol City Council, Stockholm);
- POLIS (network of European cities and regions);
- SINTEF (Norway);
- universities (Dresden (TUD), Leeds (ITS));
- Certu.

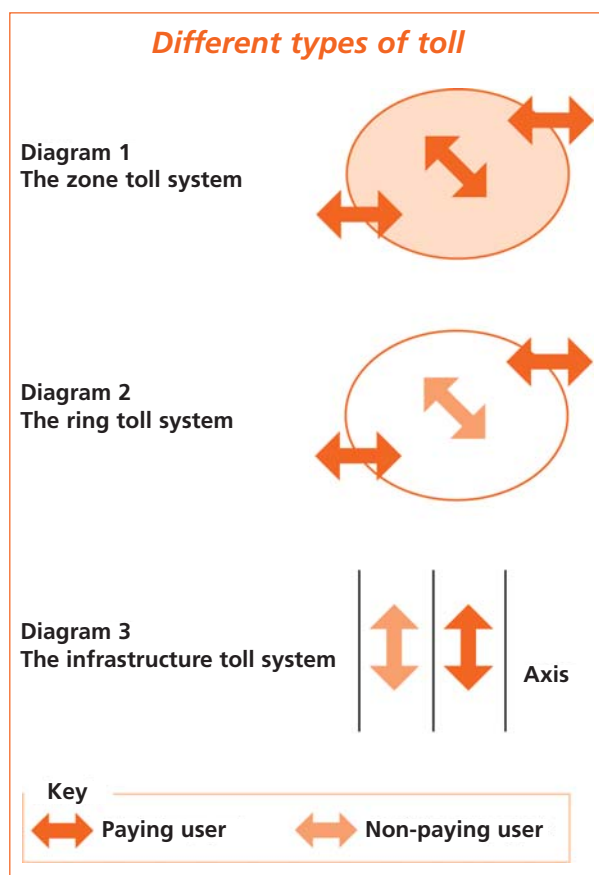
The results of this survey show that weak public support (taxation is rarely popular) and a lack of political will are the main obstacles to introducing urban tolls or other pricing systems. Other reasons cited include the difficulty of planning this type of system (costs, etc.) and problems with managing the project (administrative and financial processes). Cities themselves also blame excessively complex administrative and legal systems: how is it possible to legalise a tax on individual mobility when this has always been considered a free and fundamental right? They also cite a lack of knowledge of the effects of toll systems on urban economies

Targeted support designed to help local authorities

CURACAO's aim is to provide useful information on journey pricing. A report available on the CURACAO website contains a summary of all studies carried out to date, ongoing experiments and an annotated bibliography. Furthermore, there is a range of data collected by partners of the CURACAO project from visits to London, Stockholm and Rome. This data will be used to compile good-practice guidelines to help cities introduce their transport policies, particularly those wishing to implement an urban toll. A documentary database will be available at the end of 2008 and will allow users to compare current experiments by theme (socio-economic impact, for example). This will be accessible via the CURACAO project website. Finally, one of the project's objectives is to create a network of European cities to provide mutual support for urban transport pricing policies.

The many facets of toll schemes

It is Certu's aim to identify the objectives assigned to urban toll systems in different forms, using documents and practices identified by CURACAO. While this classification is not exhaustive, it covers the main types of toll system currently in use.



Multiple objectives...

Historically, tolls have been used to finance transport infrastructures. Their objective has evolved, however, and the majority of schemes now exist to reduce urban congestion. Furthermore, urban tolls are now designed to dissuade drivers from using their vehicles, while ensuring that they have a "right to transport" whatever their geographical, economic or social situation. This objective demands a pricing system targeted at car use and a transfer of this income to forms of transport other than the car. In terms of current experiments, toll schemes are used to achieve several objectives, whether individually or together:

- **reduce congestion in a zone:** tolls serve to reduce urban car traffic;
- **generating income:** tolls are used to finance transport systems;
- **improving the urban environment, and air quality in particular:** tolls are used to reduce environmental damage.

...achieved with different types of urban road pricing

Urban tolls can either be introduced within a predefined geographical area or on a particular road network. There are therefore two pricing categories: one is zone-based and the other is network-based. The term "urban toll" is generally used to refer to a zone-based pricing system. This term does not cover tolls designed to finance an infrastructure. The term "infrastructure toll" is used for this purpose, even if the toll is located within an urban zone.

There are several forms of urban toll that have been used to date:

The zone toll system, zonal pricing: a toll is levied on travel within a particular zone. Drivers pay a fixed price for access to this zone, whatever their journey within it (diagram 1). All journeys within the zone must be paid for, requiring a detection system that covers the entire toll zone.

The ring toll system, zonal pricing: the outer ring of the toll zone comprises several checkpoints. Passing these checkpoints requires payment. If the checkpoints are passed several times, payment must be made on each occasion (diagram 2). Depending on the configuration of the zone, a small number of checkpoints around the perimeter is normally sufficient.

The infrastructure toll system, network pricing: the driver pays to use a particular infrastructure and the money collected is then used to finance the infrastructure itself. In general, a non-paying alternative route exists. Currently, this is the only legal form of toll system in France (diagram 3). Examples of network pricing systems are the motorway tolls in France or the expressway tolls in the United States.

A flexible system for "tailored" toll schemes

Urban toll schemes are defined by the various ways in which they are applied: the chosen perimeter, pricing structures and levels, pricing hours, detection and recognition systems, payment methods, etc. The range of different decisions means that each toll scheme is a genuinely unique system.

A different system for every city...

There is a wide range of toll scheme choices and options depending on the political priorities of the city in question. For congestion toll systems, local authorities tend to set the price as high as possible to limit access to the toll zone. Furthermore, by setting specific hours and days during which pricing applies, the authority can dissipate rush hour traffic and limit traffic peaks. The focus here is on saving time and regulating traffic, which tends to result in support for the urban toll scheme from various economic actors. In terms of infrastructure toll systems, the price is set with the aim of obtaining the maximum amount of income to cover infrastructure investment, while the cost of the toll system itself is kept to a minimum. In this instance, the financial management of the toll system is key to its success. For example, vehicles may be detected when passing through a checkpoint and identified by cameras, or they may be identified by on-board equipment that communicates with satellite-based systems. Each of these systems requires different investment and operating costs. Furthermore, the local autho-

riety responsible for the toll chooses the payment methods that drivers must use (online payment, bank transfer, telephone payment, etc.) and the deadline by which payment must be made. It is important to note that toll schemes of this type do not necessarily result in traffic reduction. An environmental toll system aims to reduce the number of vehicle miles by favouring a distance-based pricing system to reduce the environmental impact and reinvest the income generated by the scheme in public transport and "green" forms of transport such as walking and cycling. Furthermore, it is possible to apply different pricing levels according to the type of vehicle against "Euro"-type pollution standards, as well as introduce exemptions for certain vehicle categories (emergency vehicles, vehicles for persons with reduced mobility, etc.). Under this system, the most highly polluting vehicles are taxed the most.

Toll schemes – the result of a local compromise

One of the major benefits of introducing urban tolls is that it encourages debate on the pricing, financing and management of the resulting urban transport infrastructures. These debates, held with the local community, are used to decide how the toll will be implemented. They are an opportunity to specify "who pays what" for urban transport and to introduce all parties concerned to the concept of charging for car journeys in dense urban environments. Toll schemes are also often an opportunity to identify the problems of public transport finance that affect the majority of European conurbations. Each city has to choose the most appropriate tools for its own transport policy. In practice, current experiments show that pricing levels and system structures are generally the result of a compromise between local participants rather than a theoretical economic calculation. In London, for example, discussions that took place when the zone toll system was being installed led to a 90% discount for residents living in the toll zone, exemption for taxis and standard pricing for both cars and lorries, even though the latter produce greater pollution. For Stockholm's ring toll system, free travel was provided for local traffic and a number of exemptions were granted. By taking advantage of the range of different schemes and their flexibility, local authorities can create toll systems that are appropriate for local contexts and objectives.

Milan: an example of an environmental toll scheme

<http://www.comune.milano.it/dseserver/ecopass/>

In January 2008, Milan introduced a ring toll system around the old city with 43 checkpoints. The daily price applies between 7.00 a.m. and 6.00 p.m. and is between €2 and €10 depending on the vehicle's pollution level and the time of day. Vehicles are split into five pollution groups, with class 1 (hybrid, electric and LPG vehicles) being the least polluting and class 5 (pre-Euro or Euro 0 vehicles) being the most polluting and therefore subject to the highest taxation. All road users must pay the toll (including taxis), except for vehicles in classes 1 and 2 (Euro standards 3 and 4), public transport vehicles, emergency vehicles and two-wheeled vehicles. In the first four months of the scheme, monthly traffic levels fell by 15%. There has also been a significant change in the types of vehicles seen in the zone (+124% for class 1 and +29% for class 2). Gross income from the scheme is estimated at around 5 million euros per month.

Placing urban tolls at the heart of transport policy

In addition to the opposition they face, urban tolls on their own have only a limited benefit. In order to be effective, they need to be designed as one component of a wider urban mobility management policy. Urban toll schemes must be evaluated (before and after introduction) and adjustments must be made to allow the system to evolve. They must also be consistent with existing tools (parking policies, etc.).

Overcoming opposition to tolls

In the context of introducing urban tolls, it would be wise to create or revise an urban transport plan (known as a PDU in French) to include provisions for such a measure, should it ever be made legal in France. Urban tolls are seen as an additional tax by car drivers. According to an IFOP survey on 5th October 2007, which looked at French attitudes to the “transport” measures of the Grenelle de l’Environnement, 68% of people questioned said they were against urban tolls. Car drivers believe that they are already heavily “taxed” and are interested in finding credible alternative solutions to the car. Some say that they would accept an urban toll if public transport were to be made free. As well as making a system “popular”, authorities responsible for urban tolls also have to manage problems of social equity to make the system work effectively. These problems relate primarily to poorer households who are located far from their place of work, and who are therefore reliant on the car. These households should not be penalised, and the authority responsible for the toll will have to come up with fair solutions (reduced prices for public transport, etc.).

By designing an urban toll system as one component of the urban transport plan, the authority will be able to make it more acceptable and pay greater attention to questions concerning social equity. The toll system will also benefit from the cooperative processes that form part of the urban transport plan and its design will be consistent with other transport policy tools.

Making urban tolls an evolving system

By considering how to make urban tolls an evolving system and designing them with this aim in mind, authorities are also able to reinforce their legitimacy.

The idea is that the system should not be set in stone at the point of its design and introduction. In other words, such a scheme could be subject to experiment (e.g. the Stockholm toll) to test the system and correct certain aspects as required. In the light of increasing environmental constraints, existing urban tolls are likely to be modified to make them more flexible and scalable than they are at present. There are two main reasons for this. Firstly, the system must be able to adapt to social and economic changes such as rising fuel costs, ageing populations, etc. Secondly, the system must be able to evolve in line with technological advances. In fact, recent technological progress (GPS, detection systems, etc.) mean that, in the medium term, it may be possible to develop a pricing system based on the number of miles travelled. Pricing per mile may therefore soon be a reality. This would allow authorities to adjust prices according to which zones are crossed, at what times, total journey times and technological standards. Widespread schemes are currently being tested, in the UK and the Netherlands in particular. Currently, there is no “pay per distance” toll scheme in operation, except for taxes on HGVs in Switzerland and Germany.

However, there are alternative or complementary systems in existence or under development and these could be applied in addition to, or instead of, urban tolls.

In 1999, Certu developed a concept called the “carte multimodal” (multimodal card) which involves paying a monthly subscription per household (and per vehicle). This then allows the holder to use a private car without restrictions and also provides free access to public transport. This concept may now be launched in the form of a “city mobility services access card”, focusing specifically on public bicycles (such as the Vélo’v or Vélib’ schemes in Lyon and Paris) and car-sharing. Furthermore, the introduction of a transportation rights card could be tested by “allocating” each citizen the right to use his or her private car up to a predefined maximum number of miles. To continue travelling above this “quota”, the driver will have to purchase rights from other, less mobile citizens. There is currently no such urban mobility regulation scheme in existence, but research has been carried out to explore this possibility (Drast, 2005 and Raux, 2007).

To be continued...

- In France, an urban and suburban transport executive committee has been created to discuss the practical application of the outcomes of the Grenelle de l'Environnement. What role will urban tolls play among the various proposals?
- Since January 2008, Milan has had an urban toll system based on the concept of "polluter pays" principle. What lessons can we learn from this experience?
- Does the appearance of new mobility services (car-sharing, bicycle hire, etc.) demand a change in the approach to pricing, focused on service-based payment?
- London has announced that a new system will come in force in spring 2009: an automatic prepayment card, from which the toll charge is deducted according to the time of travel. How many cities will have adopted this system 10 years from now?
- Local European decision-makers will have to rely much more heavily on urban tolls in the future. Will French conurbations use urban tolls to regulate urban mobility? If so, what form(s) will these systems take?

Further information

Research works

- Certu, *La tarification des déplacements urbains*, 2001;
- Certu, *Urban road pricing: the question of acceptability*, 2007 (in English, translated from a summary of *La tarification des déplacements urbains*, 2001);
- Raux (C), *Le péage urbain*, La Documentation Française (as part of the PREDIT research programme), July 2007;
- Raux (C), *Les permis négociables dans le secteur des transports*, La Documentation Française, 2007, 98 pages.

Useful websites

- CURACAO project website <http://www.curacaoproject.eu>
- Certu website: <http://www.certu.fr/>
- Grenelle de l'Environnement website: <http://www.legrenelle-environnement.fr/grenelle-environnement/>

Certu contacts for the CURACAO European project

- Damien VERRY: damien.very@developpement-durable.gouv.fr
- Nathalie PITAVAL: nathalie.pitaval@developpement-durable.gouv.fr

Contributors: Nathalie PITAVAL, Damien VERRY.

© 2008 Certu

Graphic design: Cete Lyon. DTP and editing: Mouvement perpétuel, Corinne Béné.

Certu
Centre for the Study of Urban Planning, Transport and Public Facilities
9, rue Juliette Récamier - 69456 Lyon Cedex 06
téléphone : 04 72 74 58 00 - télécopie : 04 72 74 59 00
www.certu.fr