What are the effects of road pricing? Politicians in many cities all over Europe are asking this question. Models have been developed and used around the clock to try to find answers, but after some years, in which high profile models have been tested and weaknesses revealed, politicians are seeking other ways to find the answers.

Copenhagen and Gothenburg are looking at alternatives. Real users are testing road pricing with real money. How does this work? Since taxing just a few volunteers is not an option, a different approach has been necessary. Instead of taxing the driven kilometres, the volunteers are paid for each kilometre they save. The resulting economical effect for the test driver is the same per kilometre. To measure the number of saved kilometres, most drivers are running firstly through a control phase, which will measure their normal driving behaviour, and then through a tax phase where the costs are calculated. A positioning unit, installed in the car, is used to monitor the test drivers. The unit detects the position of the car by using GPS satellite technologies. All the positions are used to calculate the cost of driving in the specific areas. The result is a unique database of the driving behaviour of 500 drivers in Copenhagen alone. A total of 150 man-years of driving behaviour has been stored, second by second. This large amount of data allows a very detailed analysis of the driving behaviour of each driver, and of the test group as a whole.

Three road pricing tax structures are being tested in Copenhagen: high cost km charges, low cost km charges and finally a multi-cordon charging system. The multi-cordon charge system does not really require GPS to be tested, but as GPS allows easy simulation of a cordon system, Copenhagen has chosen to use the same technology for all three tax structures.

The GPS technology has proven to be sufficiently reliable for trial purposes, but it is also very evident that GPS technology cannot stand alone in a full scale charging scheme. Positioning requires a quality signal but transmission can easily be disturbed, e.g. by tall buildings, tunnels, the roof of the car or deliberately by the driver. Still, for testing purposes or as a complement to other technologies GPS seems to have a bright future.
In May 2002, PRoGR€SS reached the halfway point on its four year timescale. Partners had a successful Mid-Term Review, during which the activities undertaken so far in the project and future work were discussed and agreed with the Commission.

Key areas of work have focused on the development of schemes, building acceptability and planning and beginning evaluation work. Whilst some cities are still in the planning stages, the implementation of demonstration trials in Copenhagen and Gothenburg and improvements to existing schemes in Rome and Trondheim have begun.

Copenhagen and Gothenburg are part way through trials of GPS technology using volunteers, for distance based and zonal type charging. Results of the trials are being evaluated and will be reported in future deliverables.

In the last newsletter Rome outlined the implementation of their electronic Access Control System, which went live in October 2001. This system has been evaluated and the first results are providing interesting reading for cities. Further detail is provided in Deliverable 3.2 but the results are now being used to develop the scenarios for testing in PRoGR€SS. In Trondheim the new AutoPASS system for tolling and an integrated electronic ticketing system have been implemented. Work has also been undertaken to develop the demonstrations further with a new city centre zone for the tolling. Helsinki has been developing the modelling scenarios for their participation in PRoGR€SS and results are due to be reported shortly.

In three of the cities there have been major changes to the demonstration elements of the project, which were agreed at the Mid-Term Review. Due to delays caused by the political approvals process and the implementation of the complementary measures the real schemes anticipated for Bristol, Edinburgh and Genoa have been replaced by volunteer trials. Genoa is basing this trial on the proposed real scheme to provide information for future decisions; Bristol and Edinburgh are undertaking technology trials using volunteers. In Bristol the linkages with the nationally proposed distance based lorry charging will be investigated with a trial of GPS equipment in commercial vehicles. In Edinburgh ANPR equipment is being tested along with the retailing of licences.

The PRoGR€SS website (www.progress-project.org) has been updated and includes information on deliverables approved by the Commission including recent deliverables Social, Economic and Legal Frameworks (D4.1) and Final Demonstration Scheme Specification (D3.2).

The planned new E39 in the middle of Norway will be the first tolling project to be realised through a private-public-partnership contract. The contractor will be responsible for the planning, construction and later maintenance and operation of the road for a period of 25 years. The toll income will be used to cover both construction and maintenance.

The 15 year period of financial support provided by the government for the tolling systems in Norway’s major cities, i.e. Bergen, Oslo and Trondheim, is now coming to an end. Political and professional discussions are looking at using urban pricing schemes to manage demand, which is now possible in Norwegian legislation. The city councils in Bergen and Oslo have approved a new charging scheme where the money collected from the road users, will be used both for road construction and financing public transport. For Trondheim, see the PRoGR€SS city update on page 5.

Over 50 percent of the cars in Norway have been fitted with an electronic tag based on the AutoPass standard, and there are plans to develop a new nationwide integrated payment system for all types of road user charging, i.e. tolling, ferries, parking and public transport. The development of an effective fee collection system offers new possibilities for financing the road infrastructure. Monies collected within the transport system could be earmarked for public transport services in the future. Surveys have shown that Norwegians would accept such a move if combined with reduced taxation on car use.
Belgium
Road user charging for the region of Brussels was recently discussed at the national level. The government however abandoned the idea as being socially unacceptable, since there are no real alternatives for travelling at a reasonable price (the public transport infrastructure is already saturated).

Finland
Proposals for urban pricing for the whole Metropolitan Area of Helsinki and for Helsinki City Centre only have been made, and alternatives studied at regular intervals since the early 1990s. However, the proposals did not gain favour with many of the political parties, the media or motorist organisations and were thus withdrawn. Discussion of the issue is now limited in the main to academics.

France
Public opposition to road tolls in Lyon and Toulouse was so strong that these proposed schemes were abandoned. However, successful road tolling schemes in Paris, Marseille and tunnels in Lyon are in operation, although these are not congestion charging schemes. An outer ring road being built in Paris is to be tolled and Lyon, Grenoble and St Etienne are currently considering a number of transport issues together, including road pricing.

Germany
At the moment it is not legally possible to introduce urban road pricing in Germany. Its introduction is being hindered by the responsibility of various institutions for different categories of roads.

Ireland
A recent study into road pricing concluded that congestion charge in central Dublin could reduce congestion. However, the success of any scheme would be highly dependent on a parallel programme of public transport enhancement.
**Bristol**

Delays to the implementation of some complementary measures have meant that Bristol will not be implementing a full road user charging scheme during PROGR€SS. A technology trial of VPS charging, and ANPR enforcement methodologies, using volunteer commercial/fleet vehicles is being developed with the national government. The demonstrator will inform the technology choice for the full scheme, and investigate the interoperability of a city cordon with the proposed national charging scheme for lorries.

Development of the full road user charging scheme is continuing. The detailed design modelling study has been almost completed, assessing the impacts of different charging scheme options in association with a package of transport measures. Development of policy and guidance is continuing through the Charging Development Partnership and Bristol is currently developing the business case for charging.

Implementation of complementary package measures has continued. In April, a new Park & Ride site was opened to the northwest of the city, and the rollout of showcase bus route measures has progressed.

**Edinburgh**

During June and July this year Edinburgh undertook a major consultation exercise. This was targeted at residents of the city, as well as those from the city’s catchment area who might be affected because they work in Edinburgh or visit the city at least occasionally. Almost a quarter of a million leaflets, incorporating a questionnaire, were distributed throughout South East Scotland.

The consultation set out three options for consideration:

A. A city centre charging cordon, with an investment package to improve public transport within the city;

B. A city centre charge and a charging cordon at the edge of the built-up area. Revenues would be used for transport improvements both within the city and linking the city with the wider region;

C. A ‘status quo’ option involving no charging and limited investment in transport improvements.

The consultation process and analysis are being overseen by the University of Westminster, partners in the PROGR€SS project. The results will form a key part of a report to the Council this autumn recommending a way forward.

**Gothenburg**

In June, the first part of the PROGR€SS field trial involving evaluation of the on-board units and user attitudes towards road user charges, was completed in Gothenburg. 85 test drivers participated in the first trial round. Feedback from the group showed that:

- Approximately 30% of the drivers who were positive about participating during the recruitment call finally installed equipment.
- Equipment in 13% of the test cars transmitted “perfect” data.
- GPS positioning performed well.
- The GSM communication had problems with repeated lack of connection at call-up.
- Software bugs in early versions resulted in power failure caused by short circuit in the central unit and unit fallout.
- The project has attracted considerable interest from the press, media, politicians, experts, students and public.

The technical problems encountered during the first phase of the field trial have been solved through hardware and software development. All units have been upgraded with the latest software over the summer and installed for the second test group (early September).
Helsinki

The PROGR=SS activities in Helsinki have two main goals: to study the effects of urban pricing measures through modelling and to study the acceptability and preliminary reactions of users via a stated preference survey. The modelling has now been completed and the project is proceeding to the acceptability surveys.

At the same time, an increase in activities regarding pricing issues are now being seen at the national level. At the beginning of 2002 the Ministry of Transport and Communications published a report on “New models for the funding of transport infrastructure services”. The report proposes changing the structure of the existing funding structure, firstly towards tax-like charges and ultimately to pricing based on geographical positioning.

Just recently the Ministries of Transport and Communications, and Finance established an informal working group to study the taxes and charges related to different transport modes taking into account the white paper proposals. In the light of these latest developments, the timing of the PROGR=SS project seems to be optimal.

Rome

Access control with a flat Road Pricing (RP) scheme, operated through an automatic control system in the east of Tiber area (4.6 km²), has been fully operational, with enforcement against violations since 1st October 2001 in Rome. The system, which has proved to be high reliable, is based on 23 entrance gates and is switched on from 06.30 to 18.00 on working days and in the afternoon only on Saturdays. Recent surveys have shown that 75% of the residents within the LTZ and 53% of retailers accept the new system. Indeed, 65% of residents and even 67% of the retailers agree with the road pricing policies planned for the future.

A 20% reduction in traffic flows and a 6% increase in public transport usage were recorded. There was also an increase in transits after the system closes at 18.00, suggesting that access control could be extended in the evenings, possibly up to 22.00, and on certain main holidays.

It seems clear however that the fares to be applied in a pure road pricing scenario (i.e. with everyone able to access the LTZ), would be too high to be socially or politically accepted. Regulated access for powered two-wheelers (at least two-stroke vehicles without exhaust emissions control) and freight vehicles is now needed if a reduction in air pollution and traffic flows is to be achieved.

Trondheim

The City Council approved the final upgrade of the existing tolling system late in 2001. A new City Centre toll zone will be introduced from early 2003, with the aim of:

• increasing the income of the toll system (from 140 to 170 MNOK)
• securing the funding of the investments in the Trondheim Package
• improving equity

As a result, Trondheim’s urban pricing demonstration scheme in PROGR=SS has been adjusted. It now consists of the following tests:

1. Evaluation of the long term effects of tolling (a follow-up study after 10 years of urban tolling).
2. Evaluation of the proposed City Centre tolling zone.
3. Introduction of a new through traffic road user charge for the City Centre.

All the tests in Trondheim are based on real life systems. The third test has not so far obtained political approval. The benefits of the scheme correspond closely to the political goals in the local transport plan (i.e. to reduce traffic, improve the environment, improve accessibility and stimulate public transport). Considerable work is currently taking place to get the necessary political support.
The first city to implement a congestion charge in the UK is Durham in September 2002. A €3 charge will be levied on all drivers entering part of the historic core of the city. Whilst the scheme is very simple, it is the first application of the legal powers which will form the basis of future schemes.

Following public consultation on the proposed congestion charging scheme for central London at the end of 2001, the Mayor of London decided earlier this year to go ahead with the scheme. After various legal and other challenges, the date for implementation has been set for 17 February 2003.

The congestion charging team at Transport for London Street Management has been developing the scheme, along with a range of complementary measures, since 2000. Procurement of the necessary technology and services is now in progress.

The scheme operates using a virtual area based licence and covers the heart of central London (21 square kilometres). A variety of exemptions and discounts which have been subject to public consultation are also in place. The scheme will be enforced using Automatic Number Plate Recognition (ANPR) technology.

**Implementation and Operation:**

Drawing on the Singapore experience

The CUPID Workshop held in Rome in May 2002 considered implementation and operation issues. Of particular interest was a presentation by Gopinath Menon who has been involved with the operation of the Singapore Road Pricing system since its inception in 1975. The experience from Singapore can be used to provide a generic list of implementation and operation issues that should be considered by all cities considering the introduction of urban road pricing.

In 1998, the original manual road pricing system in Singapore was replaced by an electronic road pricing system (ERP). The ERP charged all vehicles, except emergency vehicles, entering the central area of Singapore on weekdays (all day) and congested stretches of expressways and major roads (during the morning peak). The capital cost was S$197 million (≈110 million) and the operating and maintenance cost was S$824 million (≈13.4 million) per year. The revenues from the system are not used to support expenditure on transportation infrastructure and operations.

The system’s main physical components are: In-vehicle Units (IU), note-book sized devices fixed permanently to the windscreen of four-wheeled vehicles and to handlebars of motorcycles and scooters; CashCards, prepayment cards which are inserted into the IUs; overhead gantries (located at entry points); and a Control Centre. Charges vary from 50 cents (≈0.28) to S$3 (≈1.67) for cars and can be different for each half-hour and at each gantry. The charges for other vehicles vary in direct proportion to their pcu values (0.5 for motorcycles, 1.5 for heavy goods vehicles and 2 for large buses). The charges are updated every 3 months in response to the experienced level of congestion.

The issues highlighted by the Singapore experience which prospective candidates should consider in developing their own road user charging schemes include:

- What type of vehicles (if any) should be given exemptions?
- What are the expected capital and maintenance costs of the system?
- How should revenues from the system be used?
- How long a period should be allocated to installing IUs? (it took 10 months in Singapore to install them in 700,000 vehicles).
- If IUs are used, what steps should be taken so that they do not obstruct the vision of drivers or unbalance motorcyclists?
- How long a period should be allocated to installing IUs?
- If charges differ by location and time period, how should this information be presented to drivers?
- If charges are updated regularly, how should new charges be set and how should drivers be informed of these changes?
- What steps can be taken to avoid local congestion at gantry points immediately before and after the charging period?
- Should drivers be able to pay by monthly bill instead of by prepayment?