

Road Pricing and Congestion Charging



ERP gantry at North Bridge Road, Singapore

Definitions

Road pricing means charging for the use of roads in a way that reflects the costs of using them - paying more when roads are congested and less when traffic is light. Congestion charging is a form of road pricing that aims to reduce motor vehicle travel into congested urban areas.

Context and Policies

Road pricing is a form of demand management that has become accepted as a policy measure to combat pollution and congestion. It works because it changes behaviour. Motorists are encouraged to change their habits, travelling at different times or by different routes, possibly to alternative destinations, or making their journey by public transport and/or non-motorised transport (on foot or by cycle). Road pricing works best when applied in parallel with other measures, such as public transport improvements and provisions for cyclists and pedestrians. Road pricing is a tool to reduce congestion and thereby improve air quality and standards of health. It can also reduce the need for new or widened roads. Key stakeholders are vital to the success of a pricing scheme, and must be consulted effectively to raise the level of awareness and support.

Examples

- **The Central London Congestion Charging Scheme** has been in operation since February 2003 and was extended westwards in February 2007. During its hours of operation, drivers of vehicles are required to pay a standard daily charge of £8 (increased from £5 in July 2005) to travel within the Congestion Charging zone, subject to a number of discounts and exemptions. The principal aim of the scheme is to reduce congestion in central London by encouraging drivers to switch from private car use to other modes of transport. It also produces net revenues to support London's Transport Strategy (in the

2007/08 financial year these amounted to £137 million, the majority of which was allocated to improvements to bus operations in Greater London). Following its introduction in 2003, congestion was substantially reduced within the zone and traffic entering the zone was reduced by around 20 per cent, making central London a more pleasant place to live, work and visit. The initial traffic and congestion reductions led to overall CO2 reductions of 16 per cent inside the charging zone, a reduction of emissions of oxides of nitrogen (NOx) of eight per cent and fine particulate matter (PM10) of six per cent.

- **The Singapore Area Licensing Scheme (ALS)**, introduced in 1975, was the first urban congestion pricing scheme aimed to manage traffic demand to be successfully implemented in the world. Motorists had to purchase daily or monthly licences to enter the 6-square-kilometer central area (called the "Restricted Zone") - later increased to 7.25-square-kilometers - during restricted hours. Car pools with four persons including the driver were exempt from paying the congestion charge (which was S\$3 for a daily licence or S\$60 for a monthly licence at the time). Taxis were initially exempt but then included after the first two months of operation. The initial drop in traffic entering the Restricted Zone was 44%, but it crept up to a 31 % drop by 1988. This was despite the growth by a third in employment in the city and by 77% in vehicle population during the same period. The drop in traffic was caused by diverting away from the city centre those motorists whose destinations were not the city itself but had merely been using the city roads as short cuts, as well as by those who changed their journey start time to avoid paying the ALS fees. There was little evidence to suggest that motorists had transferred to public transport in significant quantities.
- **The Singapore Electronic Road Pricing (ERP) Scheme** replaced the Area Licensing Scheme (ALS) in September 1998. The ERP is an innovative tool for implementing congestion pricing. The basic idea of ERP is similar to the ALS, but ERP is technologically sound so that charges can be varied over time and location, reflecting the true cost of vehicle use in central business districts. In this system, all 33 ALS "gantries" (entry points) were replaced with ERP gantries for the 720 ha core area, and each vehicle to enter into the restricted zone must be fitted with an "In-vehicle Unit" (IU). The IU unit reads from a stored-value cash card, from which charges are deducted automatically as soon as vehicle enters into the restricted zone through an ERP gantry. At the moment, pre-determined ERP charges vary each half-hour of the day, from S\$2.50 during peak hours to 50 cents during off-peak hours, depending on the road section. Charges are different for motorcycles, cars, cargo vehicles, taxis and buses, etc.; different IU units are installed in each category of vehicle. ERP charges are subject to review every 3 months to suit changing traffic conditions, these charges are basically tied to prevailing speeds with the aim of maintaining traffic speeds of 45-65 km per hour on expressways and 20-30 km per hour on arterial roads. Frequent adjustments, such as special-reduced ERP pricing during school holidays when traffic volume is lower, are possible, and being carried out.
- **The ECO-PASS Scheme in Milan** has been in operation since January 2008. It is designed to restrict access to an 8-sq-km (three-square-mile) inner area of the central area of Milan by charging the vehicles that pollute most heavily. Ecopass aims to make the air cleaner by reducing PM emissions by 30% and relieve congestion by reducing the

number of incoming cars by 10% (and thereby speeding up public transport in the area). Money raised will go towards buses, cycle paths and green vehicles. The Ecopass Area has 43 entrance points, each equipped with CCTV cameras designed to record vehicle licence plate numbers and pollution class. Ecopass costs between two and 10 euros (about \$3-14) for vehicles entering the city's eight square-kilometer center for the most polluting models. Electric, hybrid, and some low-polluting cars are exempt. The city is seeking to raise 24 million euros a year (about \$35 million) and will invest about two-thirds of the take in improving public transportation. About 90,000 cars cross the charge area daily, where 13% of daily car journeys take place, according to the city's Web site. That compares with 4.8 million journeys inside and through the external Milan borders, of which less than a third is by public transport. The city aims to curb particle matter circulation in the center by 30%. More than 39,000 cars today enter the monitored zone between 7:30 a.m. and 5:00 p.m., an additional 8,000 commercial vehicles also enter the area.

- **The Stockholm Congestion Charge** is a congestion pricing system implemented as a tax which is levied on most vehicles entering and exiting central Stockholm, Sweden. The congestion tax was implemented on a permanent basis on August 1, 2007, after a seven-month trial period between January 3, 2006 and July 31, 2006. The primary purpose of the congestion tax is to reduce traffic congestion and improve the environmental situation in central Stockholm. The funds collected will be used for new road constructions in and around Stockholm. A referendum was held in September 2006 a couple months after the end of the trial period. In the referendum, the residents of Stockholm municipality voted yes and in 14 other municipalities voted no to implement it permanently. On October 1, 2006, the leaders of the winning parties in the 2006 general election, declared they would implement the Stockholm congestion tax permanently. The parliament approved this on June 20, 2007, and the congestion tax came into effect on August 1, 2007. Since beginning operation, the charge has resulted in a 15% reduction in traffic and a 10-14% drop in CO₂ emissions.
- **Other cities:** Durham, England; Znojmo, Czech Republic; Riga, Latvia; and Valletta, Malta, have implemented congestion pricing to reduce traffic crowding, parking problems and pollution, particularly during the peak tourism season. Durham introduced charges in October 2002, reducing vehicle traffic by 85% after a year; prior to this 3,000 daily vehicles had shared the streets with 17,000 pedestrians. Valletta has reduced daily vehicles entering the city from 10,000 to 7,900; making 400 readily available parking places in the centre. There has been a 60% drop in car stays by non-residents of more than eight hours, but there has been a marked increase of 34% in non-residential cars visiting the city for an hour or less

Issues

Pricing and congestion charging schemes can be viewed as unfair and politically risky. To overcome such risks, cities need to engage in effective consultation and marketing exercises

Privacy can be key issue. A congestion charging scheme in Hong Kong was abandoned partly because people thought their movements might be tracked. Another concern is fairness. Should poor motorists pay a larger

proportion of their income than rich ones? Experience shows that this depends on how the congestion charge revenues are spent. Congestion charging is likely to be more acceptable if the revenues subsidise services predominantly used by lower-income groups, such as buses.

Edinburgh initiated an implementation process in 2002. A referendum was held in 2005, with a majority of residents (74.4%) rejecting the proposal. Councils from across the West Midlands, in the United Kingdom, including Birmingham and Coventry, rejected the idea of imposing congestion pricing schemes on the area in 2008, despite promises from central government of transport project funding in exchange for the implementation of a road pricing pilot scheme. In 2007, New York City in the United States shelved a proposal for a three-year pilot program for implementation in Manhattan, and a new proposition was denied in 2008, with a potential federal grants of USD 354 million being reallocated to other cities.

Actions

There are two ways of charging for road use. One is to measure the distance travelled by road users. The other is to charge a fixed fee for travel into or within a zone (such as a city centre) or along a section of highway or a special lane (such as an express lane). With both systems, charges can be varied according to vehicle type and time of day or week. Payments can be made online, by telephone (including text messaging), or by smartcards (through direct debit or monthly accounts).

The report "[Road pricing. Can the technology cope?](#)" published by the UK Institution of Civil Engineers (ICE), sets out the following "ingredients for success" for road pricing schemes, based on international experience:

- Technical standards have to be agreed, so that all equipment is compatible and deployed consistently.
- Users should be able to understand and use the system easily, and receive every help in making informed travel decisions both before and during their journeys.
- Charging must be seen to be fair, and to reflect motorists' actual usage of the road system. That means prices should take into account vehicle type, location, time of travel, distance travelled and other important factors.
- Reliability of the technology is key, as is simplicity of operation, to keep costs down (the London congestion charge scheme requires 50% of its revenues to cover operating costs).
- The system should be visibly robust against both fraud and accidental evasion. It should also be able to generate legally admissible records of non-compliance for use in the courts.
- It needs to cope with vehicles visiting from other countries or jurisdictions, as well as those with faulty equipment on-board.
- There need to be reassurances for the public about the collection and storage of 'private' data relating to their journeys.
- There must not be an unfair burden placed on the freight business or any other industrial sector.
- A franchising system could be established, similar to that in the mobile phone industry, in which competing companies offer road credits to their customers. Such an arrangement would generate private investment in the system, where the infrastructure is owned by the state but operated by the private sector.

Key Documents

- **Central London Congestion Charging: Impacts monitoring Sixth Annual Report**, October 2008, Transport for London (UK)
- **CfIT World Review of Road Pricing Phase 2**, 2008, WS Atkins, Commission for Integrated Transport (UK)
- **CfIT World Review of Road Pricing Phase 2 - Case Studies**, 2008, WS Atkins, Commission for Integrated Transport (UK)
- **Congestion Pricing: A Primer: Overview**, 2008, Office of Transportation Management, Federal Highway Administration (USA)
- **Green Urban Mobility - transport plans for the Copenhagen capital region**, January 2008, City of Copenhagen (Denmark)
- **Road Pricing - A Guide to Public Understanding**, 2004, Institution of Civil Engineers (ICE), London (UK)
- **Road pricing. Can the technology cope?**, 2006, The Green Light Group, Institution of Civil Engineers (UK)
- **Road Pricing: Singapore's Experience**, 2002, Dr Chin Kian Keong, Land Transport Authority, (Singapore).
- **Road pricing: What are the facts?**, 2007, Institution of Civil Engineers (ICE), London (UK)

Key Presentations

- **Road Pricing Strategy in Singapore**, 2006, Loh Chow Kuang, Deputy Director, LTA Academy, Land Transport Authority, (Singapore)

Useful Links

- **Congestion Charging, Transport for London** (UK)
- **Road User Tolling & Congestion Charging** (UK)