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EUROPEAN CONFERENCE OF MINISTERS OF TRANSPORT
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SOFIA MINISTERIAL MEETING 2007

POLICY RESPONSES TO CONGESTION : PRICING

Reference document for Session 2B

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PRICING

Reference document – Session 2B

KEY ISSUES

When should pricing be part of the congestion relief package?

- Only after infrastructure management initiatives have been deployed?
- After smaller investments to improve capacity – junction modification etc. – but before large scale investment in expanding capacity?

What financial balance between system costs and revenues is appropriate?

- To approve a national congestion charging system the Dutch Parliament requires system costs to be kept under 5% of revenues – is this realistic?

Has pricing produced net economic benefits or net economic costs?

- The benefits are the value of the congestion avoided – do we measure the value of time savings correctly?
- The costs are those of setting up and running the charging system – how can costs be reduced and how much are they likely to come down?

Political dividends and risks – which are higher?

- How much is reducing congestion appreciated by voters?
- Will users accept price rises to keep up with inflation and respond to traffic demand?
- How far can responsibility for price setting be transferred from ministers to agencies or regulators?
- Are congestion tolls better accepted than fuel taxes?

Is it sensible to toll only part of the network?

- Trucks on the UK M6 motorway prefer the congested toll-free route to the fast tolled route. Why?
- Does it make sense to toll a new facility built to relieve congestion on a parallel congested route when this results in under use of the new facility and continuing congestion on the old route?
- Should the construction costs for the new facility be recovered through a toll on the old route as well as on the new facility?

BRIEFING

This note aims to summarise experience to date in using pricing to manage congestion and draw out from this experience issues where clarity is essential when decisions on congestion pricing are taken. Accompanying fact-sheets provide details of the charging systems discussed. There are now a number of examples where transport infrastructure pricing has proved successful in moderating peak demand in a way familiar with pricing electricity and telephone services; reflecting the much high costs of providing capacity for the peak than for average levels of use.

1. Experience with Pricing for the Use of Infrastructure

1.1 Peak pricing for roads

One road, an 8 mile stretch of US Interstate Highway 15 in San Diego, uses peak pricing that is more sophisticated than anything applied in end-user electricity or telecoms markets. Single occupancy vehicles pay a toll to use lanes added to the highway for high occupancy vehicles. Standard prices vary according to time of day and week in relation to expected traffic demand. In core peak periods prices vary with congestion in real time and are adjusted every 12 minutes up to a maximum of a dollar a mile (€0.5/km). Variable pricing began in 1998 and has been generally successful in meeting its objectives of maintaining levels of service and maximising use of the lanes. Queues have recently begun to appear on the north-bound lane as a result of congestion on adjacent roads. To restore service levels, prices may in the future be linked to traffic on these adjacent roads as well as on the tolled lanes themselves. There is also a proposal to broaden the peak periods during which the highest prices can be charged.

Conventional peak pricing has been applied to parts of the motorway networks and on bridges and tunnels in a number of OECD and ECMT countries; these were reviewed in a 2004 report to Ministers[1]. Prices vary by time of day and day of the week according to fixed published schedules. Price levels are adjusted only at intervals of several years. The UK employs a more flexible pricing regime on its only tolled road concession, the 27 mile M6Toll motorway. The road provides an alternative to the heavily congested M6 motorway through the country's second city, Birmingham. The private operator is free to set tolls at the level it sees fit under the sole condition that it maintains congestion-free circulation on the new route. Charges, adjusted three times since 2003, are currently £4 (€0.14/km) for cars (£3 at night) and £8 for trucks (£7 at night). Free-flow has been maintained and charges for trucks were reduced from an initial price of £10 as virtually none were using the new road despite continuing congestion on the old route.

Singapore, London and Stockholm all use cordon charges for entering city centre roads, with lower rates or no charge in off-peak periods, at night and at the weekend. London has seen congestion cut 30%, with journey times across the centre of the city cut 14% and the reliability and predictability of journey times greatly improved. Stockholm similarly saw a 22% cut in traffic congestion.

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1. Charging for the Use of Infrastructure, CEMT/CM(2004)19.

Singapore pioneered a manual version of urban road pricing in 1975. The system was fully automated in 1998 and, like the San Diego highway, employs real-time congestion pricing. Charges vary with location, time of day and vehicle type. Currently they change in half-hourly intervals according to levels of congestion. Charge levels are reviewed every three months and adjusted according to recorded traffic flow rates. The system has been successful in moderating and spreading peak demand for a more optimal use of the infrastructure and a relatively congestion-free road network.

1.2 Rail congestion and scarcity charges

Seven of Europe's railway infrastructure managers include an element for congestion or scarcity in the variable charges levied on train operations. Some vary charges by route and time of day according to levels of demand for slots on the track. Some charge for access to stations with higher charges at the busier stations at peak times. Most railways levy variable charges per train-km and some add a charge per gross ton-km. In Europe train-km is the main component of charges for the use of rail infrastructure by train operators; in North America it is the usual way trackage rights are calculated when one railway uses another's track. Payments are thus reasonably directly related to the "consumption" of space on the network. On some railways the precision with which capacity is charged for is enhanced by differentiating charges according to acceleration characteristics (power of locomotives and weight of trains) or to the deviation of the speed and stopping pattern of a train from a standard profile for the line. Both factors give a good indication of the infrastructure capacity occupied by a train in relation to other users of the line. Differentiating charges in this way provides incentives for train operators to reduce their demands on capacity.

1.3 Airports and air traffic management

In Europe en-route charges for air traffic management (ATM) services are designed to fully recover costs from airlines and aircraft operators. Charges are based on a multilateral agreement and agreed cost accounting rules. There is currently no differentiation of charges in relation to congestion. Similar rules apply, for both en-route and terminal ATM charges, in most parts of the world although full recovery of total costs is not always achieved.

US airspace management faces a new challenge, from the introduction of very light jets (VLJs). These carry up to four passengers and cost $1.0M to $3.0M, well within the reach of many businesses and individuals. They will be certificated to operate at maximum altitudes of roughly 41,000 feet, enabling them to join commercial airliners and business jets in competing for finite en route airspace. They will have maximum cruise speeds at those altitudes that are significantly slower than other aircraft (380 knots versus 550 knots). This difference in cruising speed will pose a potentially significant airspace management issue, analogous to running passenger express and heavy freight trains on the same railway line. The potential for this to create congestion is exacerbated by the structure of charges for using Federal Aviation Administration services. A typical Boeing 737 commercial airliner flying from New York to Fort Lauderdale pays $1 506 toward funding FAA, while an Eclipse 500 corporate VLJ on an identical route using the same air traffic control services pays only $53. The Air Transport Association of America estimates that it costs FAA approximately $781 to provide those services.

Congestion is concentrated at airports and a number have experimented with congestion charges. New York introduced peak runway pricing at three of its airports in 1965 in response to rising congestion. The charge was a flat rate per plane in the peak hour, designed to persuade small aircraft to use the un-congested fourth airport.

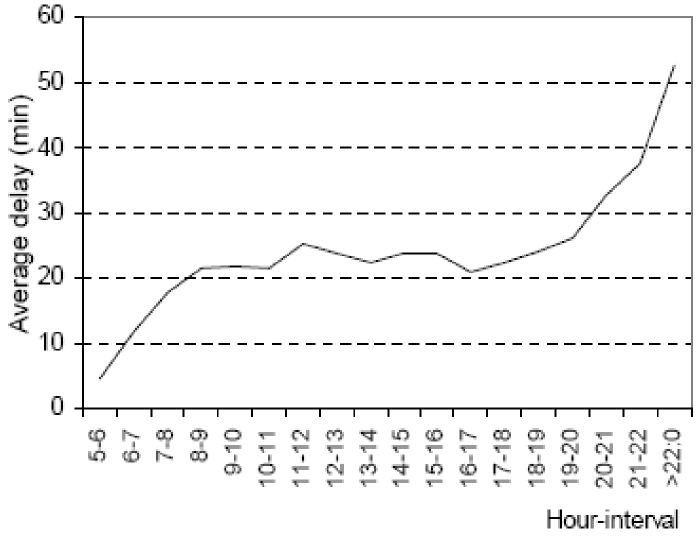
In 1988, Boston Logan airport switched from a weight based runway charge to a flat charge per take-off and landing designed again to discourage small aircraft. Court action was taken against the airport on the grounds that the charges discriminated against operators of small aircraft. The charges were ruled illegal because in this case there was no alternative airport available for the small planes. The ruling has deterred use of peak charging at other US airports but the surge in the use of private jets in the US has renewed interest in differentiating charges to manage congestion in the last year or so.

BAA introduced a peak runway charge at Heathrow in 1972 to manage capacity and extract maximum revenues on the basis of ability to pay. US airlines sued BAA for unfair charges, with the case going to international arbitration in 1988. Although the tribunal agreed BAA had the right to charge according to congestion costs, it decided the charging system was not accurate enough and required BAA to pay compensation to the airlines. Since then BAA has gradually phased out peak pricing as it has been unable to work out a robust methodology for reflecting the marginal costs of congestion.

Recent research at the University of Las Palmas (Nombela 2003) investigated airport congestion from the perspective that flight delays are a consequence of system overload, which is linked to profit maximisation decisions by airports and airlines. It also focuses on the cascade effect of congestion in air traffic, with one delay generating congestion that propagates across the system and accumulates over subsequent hours. The research examined congestion at Madrid airport where capacity expanded significantly in 1999.

The study highlights the way in which delays build up during the day. This is illustrated in the accompanying figure which shows average delays for all flights departing from Madrid at one hour intervals through the day. Congestion builds rapidly in the morning peak. The non-peak hours from 10:00 to 17:00 serve as something of a buffer but do no more than contain delays before the situation deteriorates further in the evening, with the longest delays occurring at the very end of the day.

Typical pattern of flight delay during the day at Madrid airport



Source: Nombela 2003.

Adding congestion costs borne by passengers and airlines, the magnitude of the problem of Madrid airport congestion can be assessed. Total congestion costs in 2000 were estimated at 664.8 million Euros (30% due to passengers' lost time, 70% to airlines' extra costs). A rough approximation to marginal costs, performed by simple regression analysis (relating delay to the number of flights), yielded an estimate around 7 000 Euros per delayed flight in 2000.

The research found a close correlation between arrival and departure delays. This is not surprising but the correlation was so high as to suggest that congestion at Madrid airport arises largely at the airport itself as a result of interaction between flights in the airport and intensive use of airport assets. If much of the delays were imported form other parts of the network then the correlation would be lower.

The expansion of the airport did not improve congestion. Between 1998 and 1999 declared capacity increased from 50 movements an hour to 68. Delays, however, increased in 1999 and only slightly improved in 2000 (in fact worsening for incoming flights). The first explanation is that activity at the airport increased significantly with the introduction of new services revealing the existence of a large latent demand for slots. Expansion thus reduced scarcity costs but did not improve congestion. A second factor is a marked preference among passengers for peak arrival/departure periods.

The study goes on to explore the incentives airlines and airport management have in relation to managing congestion. It concludes that airports inevitably tend to offer a higher number of slots than is socially efficient because they are not faced directly with the costs of congestion that result in running capacity above the optimal level for airport users as a whole. The airport is interested primarily in maximising the number of aircraft operations rather than optimising the number in order to avoid congestion. The study also notes that, as with other modes, the optimal level of congestion in airports is not zero. This simply reflects the fact that efforts to reduce congestion by airlines (information management and communications, (investment in manpower and capacity reserves), have a cost.

The study concludes that, as some major airports have developed information systems that allow the causes of flight delays to be attributed accurately to each main cause of delay, (saturation of airport capacity – including air traffic control – airline problems, reactionary delays, passengers, cargo problems, weather, industrial action, etc.), systems of congestion fees for airlines and airport managers could be used to reduce congestion to optimal levels. Amongst other details, because of the cumulative affect of congestion, delays early in the day would be charged more than those later on, even if they occurred in off-peak periods. Thus charging would not resemble the standard model of peak/off-peak pricing. Such differentiation of charges would provide incentives for airlines (and airports) to put the most effort into managing operations smoothly at the right time – i.e. early in the day.

The current focus of Eurocontrol is on creating a model for better cooperation and coordination between airports and airlines rather than on pricing instruments to manage congestion. Nevertheless, the critical interactions on which such co-operation needs to focus is clearly indicated by the framework of congestion costs and incentives revealed by Nombela et al.

1.4 Ports

The Southampton Container Terminal in the UK has been very successful in cutting congestion and increasing capacity in a location where port expansion is impossible through the introduction of IT systems coupled with peak pricing for truck access to the port. Since June 2005, truck operators book arrival times, modifiable up to a few minutes before scheduled arrival. A small charge, £1 (€1.5), is levied for arrivals during peak hours and penalties, £25 (€38), applied for no-shows. This enables the terminal operator to plan operations in relation to demand and it has spread peak demand. Waiting times have been cut from an average of 4 hours to 30 minutes.

The Ports in California have introduced similar booking systems, known as an appointment program, where trucking companies electronically make appointments with each container terminal prior to arrival. In an effort to encourage more off-peak usage and relieve congestion on the roads, the Marine Terminal Operators extended gate opening hours to the evenings and weekends. In conjunction, a Traffic Mitigation Fee (TMF) was introduced on each container moving on the roads during peak traffic daytime hours (Monday-Friday 8am-5pm). The fees collected are used to offset the costs of operating extended hours. In late 2004, PIERPASS, Inc was established to develop a system to track container movements and create a billing system for terminal users. In July 2005, PIERPASS began levying a fee of $40 per TEU/$80 per FEU on containers that move through the terminal gates at the Ports of Los Angeles and Long Beach during peak hours. The extended gate hours and the fee resulted in over 30% of the containers moving during off-peak in the first year of operation, reducing congestion on the highways and reducing truck turn-around time at the port. Recently, the fee was increased to $50 per TEU/$100 per FEU to help offset the nearly $190 million cost to operate evening and weekend gates. Today, PIERPASS has over 14,000 registered users with 14 terminals averaging 12,000 truck transactions per night, which represents almost 36% of all containers moving through the gate.

1.5 National road km charges

Switzerland, Austria and Germany have introduced electronic km charges for heavy vehicles. These charges have had a significant impact on truck traffic by stimulating better use of vehicles. Vehicles are loaded and routed more efficiently, aided by a growing market in internet services to locate return hauls, and the Swiss charge in particular has stimulated mergers of trucking companies to achieve logistic synergies.

The German truck charging system is designed to be able in the future to be differentiated by location, using satellite tracking to distinguish road sections. Thus charges could be linked to average congestion conditions experienced on different parts of the network and at different times of the day and week. Road sections can be distinguished reliably because only the motorways are charged for. In systems that charge all roads it can be difficult for satellite navigation systems to distinguish between adjacent minor and major roads. It can also be difficult to maintain monitoring continuity through tunnels and in the shadows of high buildings in cities. With current technology it can therefore be difficult to differentiate charges between different roads with the accuracy required to enforce charges and withstand legal challenge.

However, some of the benefits of charging for congestion might be realized without differentiating at the level of individual roads. The costs associated with road use vary greatly from one region of a country to another. Congestion tends to be concentrated in and around cities and on the trunk roads of densely populated parts of the country. Rural roads generally see little or no congestion. A km charge could be differentiated by zone so that users of congested parts of the road network pay more and rural road users pay less. The introduction of such a charge could provide an opportunity for reducing the level of fuel and vehicle taxes in countries where congestion is widespread. This could have access and equity benefits for rural communities where alternatives to private road transport are poor or absent. This is one of reasons that the UK government is assessing the possible introduction of nationwide road pricing for all vehicles in the next decade.

1.6 Fuel and road taxes

There are annual charges for access to the national road network in most countries. Revenues from these charges and revenues from fuel taxes are often destined by law or by custom to finance road networks, at least in part. The amount paid in fuel tax does depend on km driven but it also varies with vehicle type, driving style (speed, acceleration and braking patterns) and vehicle load. It therefore bears very little relation to the presence of congestion. Fuel tax is a factor determining demand for road capacity at the broadest level but even then tends to be masked by fluctuations in the price of oil. It is too blunt an instrument to manage congestion.

1.7 Linking demand management and infrastructure expansion

Congestion charges can be used to fund infrastructure expansion although to date direct linkage of charging to capacity is the exception rather than the rule:

- The UK rail infrastructure manager is required to produce a congestion relief plan for sections of track where congestion charges are applied and to make the investments in additional capacity included in the plan.
- European air traffic management charges are determined under agreement with users that explicitly link them to the cost of providing the service, at least on an average basis. .
- A number of congested US highways have had capacity added in the form of new toll lanes constructed in the central reservation in response to congestion, notably the 10 mile Riverside highway stretch of Route 91 in Greater Los Angeles. This was first highway section to be privately financed in the US since the 1940s. Controversy over an undertaking by the State not to expand capacity on un-tolled lanes, in order to protect revenues from the tolled lanes, eventually led Government to buy the toll lanes. This diffused the political controversy although no commitment has been made to earmark toll revenues for further expansion of the highway.

16 US States have developed tolled highway facilities in the wake of the Route 91 project and a further 7 have plans to open their first toll roads or toll lanes. The rationale for tolling has been to enable projects to go ahead in the face of a shortfall in State and Federal road budgets, traditionally funded from fuel tax revenues. It has not been to establish a self-sustaining model for expanding road capacity from congestion charges. Though theoretically possible to fund capacity this way, such a model may be difficult to apply where congestion tends to be worst – in and around cities – where property rights, equity and environmental concerns constrain land use policy even when sufficient funding is available.

Toll road concessions have been used to accelerate provision of new, high quality infrastructure for over three decades in OECD countries including Australia, France, Hungary, Italy, Japan, Portugal, Slovenia and Spain. They usually involve the construction of new roads, separate from the rest of the network. US concessions on the other hand often involve construction of additional lanes in the central reservation of an existing highway or parallel to an existing highway, giving them a direct role in relieving congestion. As the use of tolls spreads in the US to supplement or replace funding from fuel taxes, this distinction may disappear.

As noted already, the M6Toll motorway in the UK was built to relieve congestion on a parallel route and the private operator of the road sets charges to recover costs, make a profit and manage congestion. Elsewhere, road congestion charge revenues tend to be earmarked for purposes other than expanding road capacity on the congested route. Revenues from San Diego's Value Pricing Project are used to fund a new bus service along the route rather than extending the project or expanding its capacity. Revenues from the London congestion charge are used mainly to fund improved bus services and revenues in Stockholm will be used for investment in transport infrastructure outside the charging zone. Revenues from the Swiss heavy vehicle fee are earmarked mainly for rail rather than road infrastructure investments. Revenues from Germany's heavy vehicle road charge are earmarked for expenditure on relieving transport infrastructure bottlenecks, road as well as rail, but the charge itself is not directed at managing congestion, simply at raising revenues. Indeed the charge would have to be more than doubled on average if it were to be designed to manage congestion. Of course general charges for using transport infrastructure do raise large revenues for investment in infrastructure, especially when fuel taxes are considered user charges but the German example underlines the difference between charges designed to raise revenues and charges designed to manage congestion. The key point for congestion charges is that they give users information on the value and scarcity of the service being provided at the point of use. Fuel taxes and flat rate km charges do not achieve this.

2. Designing Pricing Systems

2.1 Congestion at toll gates

Toll gates themselves can create congestion. They are responsible, for example, for persistent congestion on the motorway linking France to the North of Spain, a major trade corridor, where on each side of the border there three or four toll gates within a distance of only 40 km of the border. Vehicles queue to pay small sums at each gate. This extreme situation arises because sections of the route are designed to be free of charge for local traffic using the motorway to bypass adjacent urban areas. One solution would be to require all users of the tolled sections to be equipped with transponders for automatic payment without stopping. In Austria electronic toll collection has been made the only way to paying the heavy vehicle fee. Similarly access to the San Diego HOV lanes is now only available for single occupancy vehicles equipped with a FasTrak transponder. Where governments do not see obligation as appropriate it should be possible to cover the costs of electronic fee collection in the toll itself rather than in a separate transponder rental charge. This would remove a common disincentive to equipping vehicles for automatic payment. The Tokyo Metropolitan Government has promoted electronic toll collection and as a result congestion at toll booths on the main route of the Metropolitan Expressway has been cut by 70%.

2.2. How to price?

As is clear from the discussion above, there are different rationales for pricing infrastructure use. Some charges are designed to cover capital costs or provide a return on private investment. Others are designed solely to cut congestion. Most pricing regimes have more than one objective, for example: maintaining congestion free conditions and providing a return on private investment (M6Toll); or managing congestion in the peak and encouraging use of the facility outside the peak (San Diego I-15). To manage congestion effectively the toll charged has to be the market clearing price. It will need therefore to float in relation to traffic demand although it may need to be capped.

For trunk roads, the EU has imposed a cap on charges for heavy goods vehicles based on average past road expenditures. This implies a rather low cap in relation to the potential costs of congestion and could limit the effectiveness of congestion pricing. A more appropriate cap would be the estimated cost of adding capacity in the specific location subject to congestion pricing and this is the approach taken in setting the rules for pricing the use of rail infrastructure in the EU.

The limited experience of charges that are allowed to float in relation to traffic levels – in real time on the on the San Diego I-15 and in Singapore, and periodically on the UK M6Toll motorway – suggests that users understand and accept this kind of variation in price levels. Users appear to be less tolerant of differences in charges levels that result from differences in construction costs or financing models. This is illustrated by protests from commuters in Sydney over large differences in the cost per km of using tolled roads to travel to the city centre from different directions. The differences mainly reflect the costs of building the tolled links which in some cases include tunnels and in others do not.

Charging full costs on certain links, such as river crossings, in a network which is otherwise un-tolled can also undermine efficient use of the network by diverting traffic around the high priced links or pricing some users off the network (users prepared to pay marginal costs but not the high charges on specific links). This can happen when expensive links in an otherwise public network are funded with private capital under toll concessions. This can argue against the use of PPPs for such links.

2.3 Costs – Financial and Economic

The costs of installing and operating road pricing and electronic fee collection systems often account for a large part of the revenues they collect. In London operating costs accounted for 48% of revenues in 2005 and incorporating capital investment costs into an annualized cost brings the ratio up to around 55%[2]. The figures for the San Diego FasTrak program are similar. For Stockholm the figures are better, 25% and 40% and expected to improve when the charging system is reintroduced on a permanent basis. For the truck km charging systems, Switzerland with its relatively high charge achieves a ratio for annualized costs of 8%, Austria 12% and Germany 23%. Generally speaking, the more complicated the network charged the higher the costs. A simple system with relatively high charges will generate large net revenues, and vice versa. The Dutch Government is examining the feasibility of introducing nationwide congestion pricing for its road network but the Parliament has set a condition that operation of the system should not cost more than 5% of revenues – a very tough target to meet.

Economic assessments of congestion charging systems are less common than financial assessments. Transport for London identified net benefits of £50 million a year in 2003.

2. See the summary and conclusions of the ECMT conference on Road Charging Systems – Technology Choice and Cost Effectiveness for details of the cost figures, www.cemt.org/topics/taxes/Paris06/index.htm

Independent assessments diverge. Prud'homme[3] found the system to have a net annual cost of £73 million. The main reason is a difference in the valuation of the time savings achieved. The TfL figure also excludes central government's contribution to the capital costs of setting up the scheme; Prudhomme includes it and arrives at an annualized cost for the system 50% higher than TfL. Santos[4] found a similar overall net benefit to TfL using a similar approach to Prud'homme but employing official UK values for time for different types of users. A rigorous comparison of the assessments is beyond the scope of this paper but the differences accurately identify the key factors in determining whether congestion charging is economically beneficial or on the contrary hurts the economy:

- How much does congestion really cost – i.e. what is the value of time saved or wasted?
- What is the cost of the charging system itself?

London is currently examining ways of reducing the cost of system operation and this is the focus of the technical work being undertaken for the reintroduction of the Stockholm charge. System cost is critical and it is not sufficient simply to compare it with the revenues collected. The revenues generated are in fact ignored in economic assessments as they are cancelled out by the cost to users of paying the charge. The economic test for congestion charging is the balance between the system cost and the congestion costs saved by using charges to reduce traffic to a new, more optimal level of congestion.

3. Results and political feasibility

3.1 Successes

Congestion pricing works. It has achieved significant mitigation of congestion in London, Singapore and Stockholm and been used effectively to maintain free flow traffic on expressways in the US and the UK.

3.2 Acceptance increases with use

The availability of alternative un-tolled routes is perhaps significant in ensuring acceptance of congestion charges on the expressways, although success in delivering uncongested infrastructure is at least as important a factor. For city-wide charging systems, lack of un-tolled road alternatives increases political sensitivity over the

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3. See the summary and conclusions of the ECMT conference on Road Charging Systems – Technology Choice and Cost Effectiveness for details of the cost figures, www.cemt.org/topics/taxes/Paris06/index.htm and R. Prud'homme and J.P. Bocarejo in Transport Policy, volume 12, 2005 (the journal published a comment by P. Mackie supporting the values of time employed by TfL but the valuation of system costs used by Prud'homme and Bocarejo).

4. Road Pricing: Lessons from London, G. Santos and G. Fraser, Economic Policy, April 2006.

introduction of charges but in both London and Stockholm public opinion became favourable once the system were in operation and achieving their objectives.

3.3 Optimising freight logistics

In the city charging systems, commercial vehicles have benefited from the charge in the same way as private cars. With expressway tolls the beneficiaries have mainly been car drivers. The UK provides an extreme example where very few trucks have used the tolled M6 relief motorway, preferring use the old and heavily congested road. The charge for trucks, €0.34/km, was clearly higher than the logistic and truck productivity costs imposed by congestion. It remains to be seen if the reduction of the charge to €0.24/km will change this balance.

3.4 Revenues

The use of revenues from congestion charges may be a more sensitive issue than the charge itself. One of the reasons for using the revenues from congestion charges to financing public transport services and/or invest in transport infrastructure is to gain public acceptance.

3.5 Equity

Equity has been a significant issue in the planning of most charging systems but once charging starts pubic concern has proved to be minimal. Drivers from all income groups use the San Diego toll lanes in order to avoid congestion on occasions when a fast, reliable journey is paramount. In the city charging systems the lowest income groups are those with least access to cars and rely on public transport, which in London has been improved markedly by investments funded from the charge.

3.6 Setting the level of the charge

Setting the level of the charge is probably the most politically sensitive task, particularly when charges have to be raised to keep up with inflation or to find a clearing level in the face of growing traffic. Responsibility for setting charges has sometimes therefore been assigned to infrastructure managers, subject to guidelines in the form of pricing objectives set out in a concession agreement or a law. While it is not realistic to expect the public to view Government as free of all responsibility for infrastructure pricing decisions, such guidelines enhance the transparency of pricing policy and can help allay suspicions that congestion charges are simply disguised taxes for raising government revenue. A pricing agency or regulator might be particularly appropriate for national charging systems and especially where the whole network is tolled, which eliminates alternative un-tolled routes.