

London Congestion Pricing

Implications for Other Cities

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by

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Abstract

Since February 2003 the city of London has charged a fee for driving private automobiles in its central area during weekdays as a way to reduce traffic congestion and raise revenues to fund transport improvements. This has reduced traffic congestion, improved bus and taxi service, and generates substantial revenues. This is the first congestion pricing program in a major European city, and its success suggests that congestion pricing may become more politically feasible elsewhere.

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Background

A basic economic principle is that consumers should pay directly for the costs they impose as an incentive to use resources efficiently. Urban traffic congestion is often cited as an example: if road space is unpriced traffic volumes will increase until congestion limits further growth. For decades economists have recommended road congestion pricing (special tolls for driving on congested roadways) as a way to encourage more efficient use of the transport system, and address congestion and pollution problems, providing net benefits to society.

In recent years a few cities have implemented various forms of congestion pricing, including Singapore, Orange County (California State Route 91) and the cities of Trondheim, Oslo, and Bergen in Norway, but proponents have been frustrated at the political resistance congestion pricing faced in other major cities.

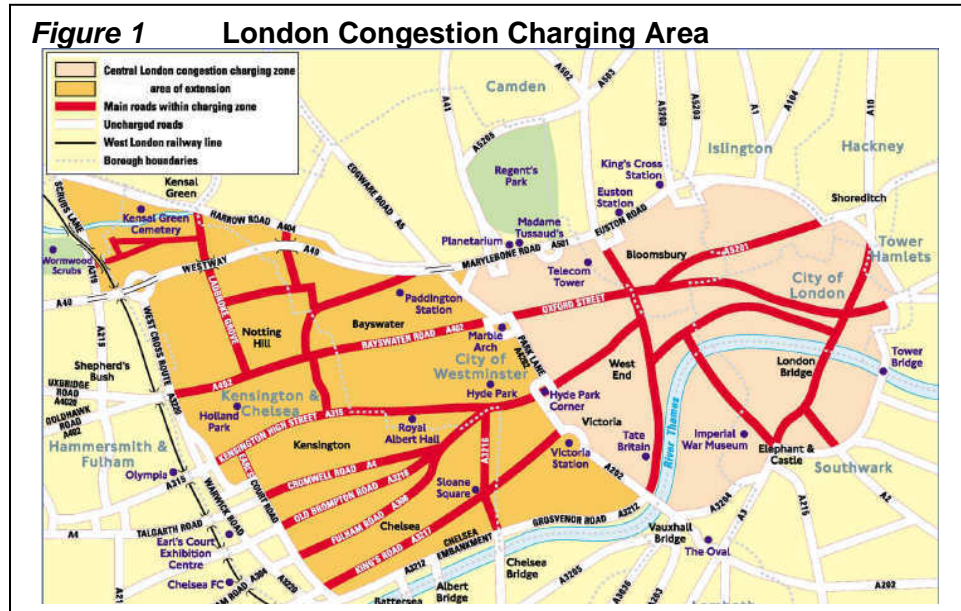
Central London is particularly suitable for congestion pricing because of its limited road capacity (the streets network in the core area is hardly expanded since the medieval ages) and heavy travel demand result in severe congestion, plus relatively good travel alternatives, including walking, taxi, bus and subway services, which are used by most travelers. Only about 10% of peak-period trips were made by private automobile. For decades transport planners have recommended congestion pricing in central London.

In 2000, London's political system was restructured to create a new, elected Mayor with new powers to manage the city's transport system and raise taxes to fund transport improvements. Ken Livingstone won with a platform that included congestion pricing implementation. Revenues are to be used to fund public transit improvements.

This plan was criticized by various interest groups, including politicians, motorist groups and some labor organizations. The Conservative Mayor candidate promised to end the congestion pricing program if elected. There are a half dozen daily newspapers published in London, and many of them were skeptical or opposed to the program. However, Mayor Livingstone, considered a "radical" politician, proceeded with the charge.

How the Program Works

Since 17 February 2003 motorists driving in central London (Figure 1) on weekdays between 7:00 am and 6:30 pm are required to pay £5, increasing to £8 in July 2005. There are exemptions for motorcycles, licensed taxis, vehicles used by disabled people, some alternative fuel vehicles, buses and emergency vehicles, and area residents receive a 90% discount on annual passes. The charging area is indicated by roadside signs and symbols on the roadway (figures 2 and 3). The city expanded the zone westward in 2007, but this was reduced back to its original area in 2007 due to political opposition.



Signs and Symbols Entering the Charging Area

Figure 2



Figure 3



Figure 4 Internet Payment Booth



Payments can be made at selected retail outlets, payment machines located in the area, by Internet (Figure 4) and cellular telephone messaging, any time during that day. Motorists can purchase weekly, monthly and annual passes with modest (15%) discounts. A network of video cameras (Figure 5) records the license plate numbers of vehicles and matches it with the paid list. The owners of vehicles that have not paid as required are sent a £80 fine. This fine is reduced to £40 if paid within two weeks, and increases to £120 if not paid after a month - the same policy for parking penalties in the inner London area.

Figure 4 Video Cameras



Figure 5 Video Camera Signs



The system is considered effective. Approximately 110,000 motorists a day pay the charge (98,000 individual drivers and 12,000 fleet vehicles), increasingly by mobile phone text message. Non-payment rates were high during the first few weeks, due to general confusion and errors (such as motorists confusing number 0 or 1 and the letter O or l), but these declined as users and operators gain experience.

This system is not considered optimal because:

- The fee is not based on how many miles a vehicle is driven within the charging area.
- The fee is not time-variable, that is, the fee is not higher during the most congested periods and lower during less congested periods.
- The fee does not vary by location. It would be more efficient to have higher rates on more congested roads.
- The system has relatively high overhead costs.
- Transit service (particularly the Tube) is crowded and unreliable, although this is changing as bus service improves and pricing revenue is used to upgrade the system.

The Day the Traffic Disappeared

New York Times, 20 April 2003, by Randy Kennedy.

On an unusually bright morning earlier this year, that mayor, Ken Livingstone, strides into the room before a bank of cameras, and with an unusually pleased look, announces a coup, one that has eluded dozens of large cities like New York, Los Angeles and Paris. He has not conquered crime or poverty, but he may very well have hobbled an urban enemy seemingly just as invincible: the car. Livingstone has just begun the world's most radical experiment in reclaiming the city from the tyranny of the automobile, a power struggle that cities have been losing in humiliating fashion for more than half a century. Since well before his election, he has been warning Londoners that far too many of them are driving into far too small a place – central London – polluting the air, choking commerce, slowly strangling their own livelihood. To stop them, the mayor decided to draw a line, literally.

The line formed a lopsided oval around eight square miles of the historic inner city. Almost anyone who drove across the line during business hours – in fact, almost anyone who moved or even parked a car on the street within it after Feb. 17 – owed the city of London £5 (about \$8) a day for every day it happened. If a driver failed to pay, one of more than 700 vulture-like video cameras perched throughout the zone would capture his license plate number and relay it to a computer, leading to a huge fine. And if the driver declined to pay those fines? The mayor vowed, only half-jokingly, that the city would relentlessly track his car down, clamp it, tow it away and crush it – “with or without the driver inside.”

The idea behind his assault on automotive freedom was neither new nor very hard to understand. If a finite resource is free, human beings tend to use it all up, regardless of the consequences. If it has a cost, they tend to use it more rationally. Livingstone, a far-left Socialist, won his mayoralty largely on the promise of applying this tough-love theory to London's streets. But in the weeks just before the “congestion charge” began, it sometimes seemed that he was the only one who believed it would work. The newspapers were full of derisive nicknames for it, like “Ken-gestion” and “Carmagedon.”

An oversimplified chronology would read something like this: the car helps to create sprawl; sprawl siphons people and political power away from the hearts of cities; the car returns to attack the city, which was never designed to accommodate so many; the city is forced to transform itself, ceding sidewalks to streets, trolley tracks to traffic lanes, parks to parking lots, whole neighborhoods to expressways.

Costs and Revenues

The program was predicted to have the following costs and revenues between 2000 and 2008, including three years of development and five years of operation, as indicated in Table 1. However, charge revenues have been lower and penalty revenues higher than anticipated. The 2004/05 budget year is projected to earn £190 million in total revenues (£118m in fees and £72m in fines), with £92 million in overhead expenses, resulting in £97 million in net revenues.

Table 1 Congestion Charging Program Projected Costs and Revenues

	Total (NPV)	Per Operating Year
Start up costs	£180M	£36M
Operating costs	£320M	£64M
<i>Total Cost</i>	<i>£500M</i>	<i>£100M</i>
Charge revenues	£690M	£138M
Penalty revenues	£110M	£22M
<i>Total Annualized Revenue</i>	<i>£800M</i>	<i>£160M</i>

This table shows the charging program's projected costs and revenues.

Travel Impacts

Transport for London and various academic organizations established a five-year monitoring program to evaluate the transport, economic, social and environmental impacts of congestion charging (www.tfl.gov.uk/tfl/cclondon/cc_monitoring.shtml).

Just over a million people enter central London during a typical weekday morning peak (7-10am). Over 85% of these trips are by public transport. Prior to the congestion pricing program about 12% of peak-period trips were by private automobile. During the programs first few months automobile traffic declined about 20% (a reduction of about 20,000 vehicles per day), resulting in a 10% automobile mode share.

Most people who change their travel patterns due to the charge transfer to public transport, particularly bus. Some motorists who would otherwise drive through Central London during peak periods shift their route, travel time or destination. Others shift mode to taxis, motorcycles, pedal cycles, or to walking

This has significantly increased traffic speeds within the zone. Average traffic speed during charging days (including time stopped at intersections) increased 37%, from 8 miles-per-hour (13 km/hr) prior to the charge up to 11 miles-per-hour (17 kms/hr) after pricing was introduced. Peak period congestion delays declined about 30%, and bus congestion delays declined 50%. Bus ridership increased 14% and subway ridership about 1%. The third-year annual report indicates that these improvements are continuing (www.tfl.gov.uk/tfl/cclondon/pdfs/ThirdAnnualReportFinal.pdf).

Taxi travel costs declined significantly (by 20-40%) due to reduced delays. Vehicles can cover more miles per hour, so taxi and bus service productivity (riders per day) and efficiency (cost per passenger-mile) increased substantially. There has been some increase in motorcycle, moped and bicycle travel, and vendors have promoted these modes (figures 6 and 7).

Figure 6 Marketing Mopeds



Figure 7 Marketing Bicycles



The program's net revenues will be used to improve public transit services, including more buses and major renovations to the subway ("Tube") system, which is widely agreed to be in need of significant redevelopment. Bus service is being improved in many ways, including an expanded bus lane system, with enforced using a network of over 1,400 on-bus and roadside video cameras.

Figure 8 London Roadway



This shows a major roadway within the charging zone.

Figure 9 Tube Travel



This shows a busy subway station.

Public and Political Response

Before implementation this plan was widely criticized by various interest groups, including politicians, motorist groups and some labor organizations. The Conservative Mayor candidate promised to end the program if elected. Many newspapers were skeptical or opposed to the program, and opponents produced a website titled *Sod-U-Ken* (www.sod-u-ken.co.uk) to promote their objections.



The congestion pricing program has since become generally accepted by the public and interest groups, including many that initially criticized it, such as automobile clubs. Within a month of its start residents of other areas in London began requesting to be included, and the Conservative candidate no longer promises to end the fee. In 2004, Mayor Livingstone was reelected, largely on the success of the road pricing program and his plans to expand the pricing zone.

London First (www.london-first.co.uk), a business group whose members account for 22% of the city's GDP, supports the city's congestion charge. A survey performed May 2003 found that its members consider the scheme to have overall positive impacts on business activity. The majority (69%) felt charging had no impact on their business, 22% reported positive impacts on their business, and only 9% reported an overall negative impact. Many industries support the charge because its direct costs are offset by savings and benefits, such as faster delivery times. Cert Logistics, a distribution company that delivers to many downtown restaurants and hotels, reports its delivery times have been cut by as much as 50%, and other industries find that their employees spend less time delayed in traffic, and so can attend more out-of-office meetings in a day. The £5 charge pays for itself in just 17 minutes of travel time savings for employees earning average London wages (£34,000 per year), and many city center employees earn far more.

London Chamber of Commerce (www.londonchamber.co.uk) members have been more skeptical of the program. A March, 2003 survey found that many city center retailers blame the charge for reduced sales (although the Iraq war and its security measures, a temporary closure of two subway lines, and a general economic downturn also impacted local business activity), and some threaten to leave the city. Opposition to the program tends to be greater among smaller retailers, and may partly reflect political ideology (the business community tends to oppose Mayor Ken Livingstone and his policies), and may represent a political strategy to gain more special treatment to benefit local retail businesses, such as lower parking fees and special discounts.

Criticism

Some issues of criticism are discussed below.

Business Activity

As mentioned above, some businesses consider themselves harmed by the program, particularly bulk good retailers that rely on customers who drive private cars. However, other economic activities have benefited due to improved access by other modes, reduced delay for high-value vehicle trips, and improved environmental conditions. A shift in the location of bulk retailing is not necessarily harmful to the regional economy if the city center locations they vacate are used for equally productive activities. Economic theory suggests that congestion pricing should increase overall productivity and business activity by favoring higher-value activities over lower-value activities, and reducing congestion costs. Some criticisms were based on inaccurate assumptions (for example, theater patronage impacts are slight since the charge does not apply evenings and weekends when most performances occur), or were addressed by special treatments (such as discounts for certain types of employees). Various studies and surveys indicate minimal overall impact on economic productivity and activity, although some sectors and businesses are affected more than others, either positively or negatively (TfL, 2005).

London Companies Learn To Love Congestion Charge

The Guardian (UK), February 16, 2004, by Andrew Clark

London's £5-a-day congestion charge will celebrate its first birthday tomorrow with a qualified thumbs-up from the capital's businesses, which overwhelmingly back the scheme but want some improvements. A study by the business lobbying firm London First reveals that 72% of companies believe the road charging experiment is working, with 14% convinced it is a failure.

Over the past 12 months the charge's critics have argued vigorously that it has starved central London of shoppers and failed to bring promised improvements in delivery times for businesses. London First's findings, which are based on a survey of 500 firms by an independent polling agency, suggest that the impact has been exaggerated. Just 26% said the charge has had a "negative" impact on the capital's economy, while 32% said it was neutral and a further 26% judged it to be positive.

The controversial charging scheme is also considered an asset for London's reputation. Some 58% reckoned it had improved London's image, while only 15% judged it to give a bad impression to outsiders. Julia Lalla-Maharajh, director of transport at London First, said: "The whole world expected it to fail. But this shows that three-quarters of businesses in London think the charge is a success and is good for the capital's image."

Estate agents, however, have reported a more mixed picture. One in four commercial property agents said the charge had been cited in lease renewal negotiations, with shops inside the zone demanding lower rates to reflect a fall in passing trade. Independent experts say the impact has been insufficiently dramatic to cause significant damage to the capital's economy. Tony Travers, of the London School of Economics, said: "There is no evidence yet of a mass exodus by businesses, and supermarkets are still opening convenience stores across the capital. "Even if the congestion charge has had an impact on the economy, whether good or bad, it hasn't been an overwhelming one."

System Accuracy

The congestion pricing system uses a network of video cameras to record license plate numbers, and optical character recognition (OCR) technology to read this information, identify “unpaid” vehicles, and generate citations for violators. When first implemented false positives (motorists wrongly ticketed) were common, but failure rates have declined over time as motorists and operators gain experience.

Traffic Spillover Impacts

There was concern that congestion may increase on nearby roads due to diverted traffic. Although some diversion occurred the effect appears to be too small to measure, and may be addressed in the future by expanding the priced area and charging more variable fees (higher rates in the center and lower rates in outer zones). Although there is 10% more traffic on the peripheral roads, journey times on them have not increased, in part because traffic signal systems on these roads were adjusted in anticipation of these traffic shifts.

Fairness

Some critics argue that road pricing is unfair because it constitutes “double charging,” since motorists already pay registration and fuel taxes, and is unfair to lower-income people who must drive, such as workers who commute to central London during off-hours. Some motorists are exempt (e.g., people with disabilities) or have substantial discounts (residents within the priced area) not available to others. This criticism has raised debate concerning what pricing is equitable and how reforms can be most fair and beneficial to consumers. Some concerns have been addressed with special exemptions or policies.

Pricing Efficiency

Most economists favor a variable road use fee that reflects the type of vehicle, when it is driven, where and how much it is driven within the priced area, since that most accurately reflects the costs imposed by driving and gives motorists an incentive to minimize their negative impacts, for example, by shifting from peak to off-peak periods, or by minimizing their mileage. The current system uses a flat fee, so once a motorist pays the fee they have no incentive to minimize driving. This system was chosen because it was relatively fast and easy to implement, and simple to understand. A more sophisticated system that allows variable fees is planned for the future.

Cost Efficiency

Program costs are high. A substantial portion (about half) of revenues are spent on overhead costs. Critics claim that transaction costs exceed total benefits (Prud'homme and Bocarejo, 2005), but others respond that congestion reduction benefits are higher, there are other categories of benefits to consider, and experience in London will allow development of more cost effective pricing programs in other cities (Mackie, 2005).

Loss of Privacy

There is concern that the network of video cameras and the system for tracking vehicles within London is an invasion of privacy. However, British cities already have extensive video surveillance systems, and access to vehicle location data is controlled to limit invasion of privacy. However, these factors have not eliminated this concern.

Table 2 Congestion Pricing Winners and Losers

Winners	Losers
<ul style="list-style-type: none"> • Downtown bus riders. • All transit riders (due to increased funding for improvements). • Taxi riders and drivers. • Motorists with high-value trips. • Most city center businesses. • Overall city productivity. • Pedestrians and cyclists. 	<ul style="list-style-type: none"> • Motorists with marginal-value trips. • City center businesses that depend on low-cost weekday car access. • Residents and motorists in border areas who experience spillover impacts. • City center parking revenue recipients.

Implications for Other Cities

London’s congestion pricing project is considered an important test of the political feasibility of congestion pricing in major democratic cities. London’s experience shows that congestion pricing is technically feasible and effective, and that it is possible to overcome the political and institutional resistance to such pricing. As a result, it will help put congestion pricing on the menu of transport improvement options in other cities.

This pricing program indicates that private automobile travel is more price sensitive than most experts believed. This is good news for congestion reduction but bad news for revenue generation.

Better pricing systems are needed to optimize the incentive, with prices that vary depending on the type of vehicle, when, where and how much it is driven. These are technically feasible, and have been implemented in Hong Kong and Singapore, but they involve greater investments and potential loss of privacy.

Implementation is not easy. It requires a suitable combination of travel and political conditions, including widely dispersed benefits and the ability to overcome public skepticism. Compared with other cities London has a particularly small portion of automobile commuters, and many of them reside outside the city. As a result, a relatively large portion of voters perceive direct benefits from the fee. Voters in other cities may be more skeptical of such benefits.

However, some combination of road pricing and improvements to other modes is the only effective way to really reduce urban traffic congestion and associated problems. Road pricing may be more acceptable when there is broad support for a new source of revenue. When residents are sufficiently frustrated with traffic problems and political conditions are amenable to innovative solutions, other cities may be able to implement congestion pricing.

Congestion Charging Sweeps The World: A Rash Of Cities Round The Globe Is Set To Travel The Same Road As London

The Observer (UK), February 15, 2004, by Juliette Jowit

Cities throughout Britain and across the world are poised to introduce their own congestion charges after the apparent success of the first year of the ground-breaking London scheme. Edinburgh and Cardiff are the furthest ahead, with plans for new charges on cars to raise money for investment, to be introduced within two years. The Scottish and Welsh capitals are both advancing proposals to charge drivers to pass a cordon around their city centres, explicitly linked to raising money for trams, trains and other transport improvements. Stockholm is to start a pilot next year and Barcelona and Milan have shown interest in the idea. In North America, San Francisco is said to be moving close to charging. And the Brazilian city of Sao Paulo is working on a proposal as well.

The surge in studies and consultations has been unleashed by the apparent success of the £5-a-day London congestion charge, which celebrates its first year this week. To mark the milestone, the London Mayor, Ken Livingstone, is likely to say latest figures show congestion in the zone is down by up to 30 per cent, average speeds are their highest since the 1960s, journey times are more reliable and businesses have benefited. Livingstone is also expected to announce a public consultation on a proposal to double the scheme to cover the West End as well as the capital's central zone. He has already braved the controversial announcement that he plans to raise fines by 25% for non-payers.

Derek Turner, the man credited with introducing the London scheme, now runs his own consultancy and says the London charge is seen as a success around the world and has given politicians the confidence to start discussing their own schemes. "I think most urban areas and suburban areas will have some sort of road-pricing regime," he said. "It's a nonsense to suggest we can sustain a free-at-the-point-of-delivery congested road network. After all, we pay for water in a metered way."

Elsewhere, studies by Deloitte consultants claim that 26 out of 34 cities in 15 European countries showed "significant support" for some form of charging. Across 11 countries in Latin America, 47 per cent of cities claimed "significant support" and a further 40 per cent were "thinking about it" – although the report does not say how many cities responded there.

In North America, San Francisco is openly talking about a congestion charge to complement existing tolls on special "fast" lanes of highways into the city to encourage vehicles with one or more passengers, and the "twin cities" of Minneapolis and St Paul in Minnesota are considering pricing all main roads and freeways. Other urban areas are expected to follow suit – but they are more likely, at least at first, to charge cars to drive into the cities, says Peter Samuel, editor of the US-based Toll Roads Newsletter. "Perhaps with the exception of lower Manhattan and San Francisco, American central cities have been developed in the automobile age and they aren't the most congested places; the most congested places are the freeways."

The World Bank is also reported to be pressing booming cities in developing countries to use charging to curb exploding traffic growth, calling for cities in the developing countries to use charges to reduce fast-growing car use, raise money for much-needed infrastructure and free up congested buses, which are traditionally the main form of mass transport. In a different type of scheme, Nottingham has proposed taxing parking places at work. There are reasons for caution. In the past year two proposals have been put on hold because of politics – in Bristol because of change in political control of the council, in New York because of wider political opposition.

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