Gear shift

International lessons for increasing public transport ridership in UK cities

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November 2023

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Acknowledgements

The authors would like to thank Dan Harvey for his work on this project as well as former Centre for Cities' staff Guilherme Rodrigues and Yash Zodgekar for their support.

About the partner

Go-Ahead is a leading public transport operator, connecting communities through bus and rail services. The group employs more than 27,000 people around the world. Go-Ahead's purpose is to move you, and the next generation, towards a smarter and healthier planet.

In the bus industry, Go-Ahead is one of the UK's largest operators running a 6,000-strong fleet across England including a quarter of London's buses for Transport for London. Internationally, the group operates buses in Singapore, Ireland, Australia and Sweden.

On rail, Go-Ahead is the majority owner of Govia Thameslink Railway which runs Southern, Gatwick Express, Great Northern and Thameslink trains. Go-Ahead also runs short-distance and intercity trains in Norway.

Go-Ahead is part of a global mobility platform owned by Kinetic and Globalvia.

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Executive summary

Covid-19 had a huge impact on the operation of public transport networks in the UK, and much focus has been on whether ridership will return to pre-Covid levels. But this misses a much broader point that public ridership in large UK cities in particular was way below comparable cities in mainland Europe.

This matters because public transport is important for connecting people to jobs, especially in highly concentrated areas such as city centres, alleviating the environmental impacts of transport, and ensuring those who don't have cars, largely poorer parts of society, are well connected.

Given this, **policy should be looking to double the share of people using public transport to get to work in places like Manchester and Birmingham.** Before the pandemic, just 16 per cent of people used bus, tram or train to get to work in Manchester, 22 per cent in Newcastle and 18 per cent in Birmingham. This compared to 33 per cent in Lyon and 44 per cent in Munich. If the UK's 10 largest cities (each with a population of over 600,000) were to match their European counterparts in terms of the share of commutes by public transport, an additional 963,000 workers would travel by public rather than private transport.

To provide guidance and inspiration as to how to close this gap, this report examines the approaches taken by cities around the world which have successfully, and often significantly, increased public transport use. It draws on a range of city transport case studies from the UK and abroad including France, Spain, Germany, Slovenia, Finland, Singapore, Canada, Japan and Australia.

Regardless of the specific measures chosen, increasing public transport use in cities requires policies to make public transport a more attractive and convenient option than other modes, particularly the car. The report looks at seven policy areas that, in combination, have helped achieve this in cities around the world.

These areas are:

1. **Increasing the density of property development** to put more people within reach of transit networks while improving the viability of new and existing systems, as has been the case in Lille.
2. **Integrating existing public transport networks** to ensure a seamless travel experience, as has been done in Queensland, Australia for example.
3. **Providing reliable and frequent services** to give greater certainty over travel times, as has been done in Singapore.
4. **Implementing priority measures,** such as enforced bus lanes, that can help make public transport attractive as part of a long-term traffic management policy, as has been done in Edinburgh.
5. **Offering clearer ticket pricing** to give greater clarity over how much a journey will cost, as has been done in Portugal.
6. **Adopting road pricing** to make public transport financially more attractive than commuting by car, as has been done in Singapore.
7. **Imposing restrictions on car ownership and parking** to make public transport more convenient and less expensive than using and maintaining a car, as has been done in Barcelona and Japan.

London, the only UK city with public transport usage comparable to the continent, has adopted over time a package of policies across these seven areas that both show how these approaches are relevant for other UK cities. Its density of development; the institutional arrangements it has in place through the existence of Transport for London (TfL); the control it has over the bus network as well as roads, trams and trains; and its ability to raise revenue through measures like the Congestion Charge allow it to make the most of the transport network it has in place.

Local and national policy should extend this package of policies to other large cities in the UK too. It should give other transport bodies the powers TfL has, it should link transport with housing development to increase densities around stations, it should bring in bus franchising where existing commercial partnerships aren't working, and it should use revenue raising tools like congestion charging or workplace parking levies.

There are politics to be managed within this, as the recent furore around the expansion of London's ULEZ scheme shows. For contentious decisions like charging drivers, politicians will need to carefully communicate how and when schemes are introduced. They should exercise the same caution though over politically popular schemes too, such as discounted ticketing, if these schemes aren't accompanied with investment to improve the running of the network. Subsidising a system without improving its performance isn't likely to bring about long-term change.

01

Introduction

Why increasing public transport use matters

Much of the recent debate around public transport use has been framed in terms of finding ways to return passenger numbers to pre-Covid levels. While this may be a helpful short-term staging point it should not be seen as the destination. Prior to the pandemic public transport use in most parts of the UK had been declining for decades with transport use in large cities well below international comparators. Rather than attempting to return to what, compared to many large cities outside the UK, was already a low level, it would make more sense to draw on successful practice from around the world to enable us to be more ambitious with a vision for greater public transport take-up.

Transport is crucial from an economic perspective because it connects people to jobs and increases the pool of potential workers from which companies can hire from. Access to education is also essential for any modern economy and here too transport provides the vital connections to schools, apprenticeships and further training opportunities. From a social perspective transport links us all to family, friends, services and other amenities.

Private transport has an important role to play in meeting these needs but it has three big problems. The first is the space occupied by roads and car parks. When taken together parking spaces in London amount to fourteen square kilometres - an area ten times the size of Hyde Park.[1] Parked cars need at least three times more space than public transport and ten times more space than bicycles. When traffic is on the move even more space is required to maintain safe distances between vehicles. At 30mph one car requires 28 times more space than a cyclist and 70 times more space than a pedestrian.[2]

1 Centre for London (2020), Reclaim the kerb: The future of parking and kerbside management in London, London: Centre for London

2 Nello-Deakin S (2019), Is there such a thing as a 'fair' distribution of road space?, Journal of Urban Design, Volume 23 Issue 5, p698-714

Second, private transport has a detrimental impact on the environment in terms of carbon and nitrous oxide emissions. This creates air pollution which is not only unpleasant but kills thousands of people in the UK each year.[3] Finally, private transport puts those at the poorer end of society at a disadvantage.[4] Those less likely to own a car are also likely to have greater difficulty accessing jobs and education.

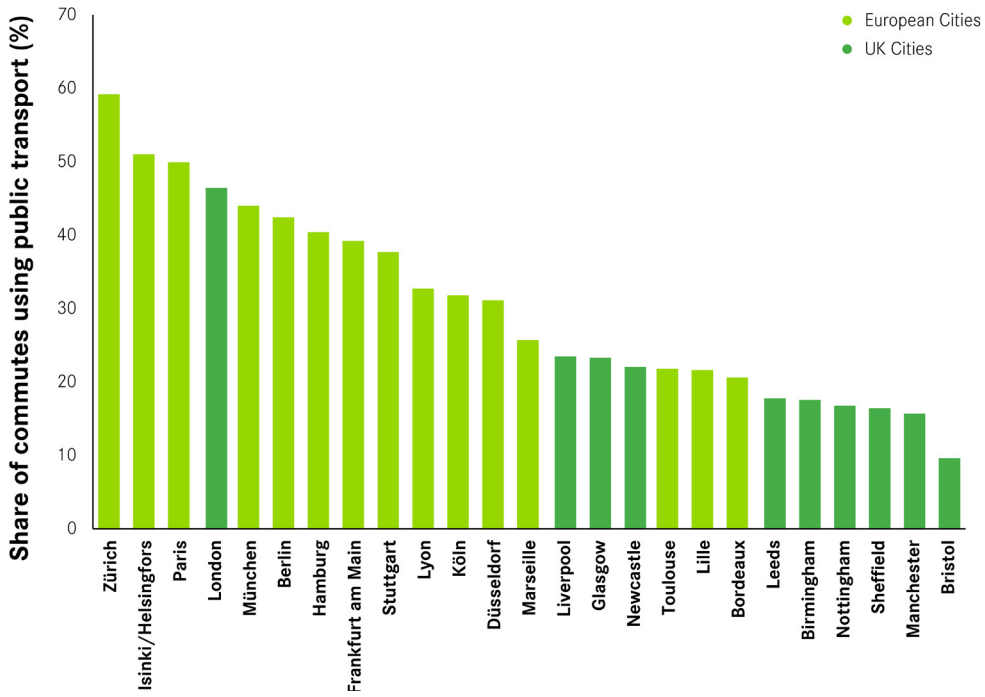
For these three reasons policy at both the local and national level should be encouraging modal shift from private to public transport. These efforts should focus on ridership in the UK's largest cities outside London. Public transport is significantly easier to provide in dense urban areas because more people live close to stops and stations and there is greater competition for limited road space, which results in traffic congestion. These factors increase demand for public transport and make it a more viable proposition than is the case in areas with lower population densities. This is clearly seen in London – 46 per cent of people in the capital use public transport to commute to work and this rises to 80 per cent for those working in central London (with a further 10 per cent cycling or walking).[5]

But in other large cities in the UK the figures are much lower. Figure 1 shows that only 16 per cent of Birmingham and Manchester residents commute to work using public transport compared to 40 per cent in Hamburg and 33 per cent in Lyon. Out of the 25 European cities sampled, six of the bottom nine for public transport use are UK cities.

3 Centre for Cities (2019), Cities Outlook 2019, London: Centre for Cities
4 The Health Foundation (2023), Trends in households without access to a car, London: The Health Foundation
5 Centre for Cities calculations using Census 2011

Figure 1: Large UK cities have lower shares of commuting by public transport than their European peers

Share of commutes using public transport across UK and European cities with population of over 600,000



Source: Census 2011, Eurostat Transport Cities and Greater Cities (2016 data)
Note: Countries selected include France, Germany, Switzerland, Finland and Estonia based on Eurostat data availability. European cities defined according to Eurostat's city definition.

If the UK's 10 largest cities (each with a population of over 600,000) were to match their European counterparts in terms of the share of commutes by public transport, an additional 963,000 workers would travel by public rather than private transport. This would double the number of workers using public transport to travel to and from work. If the UK's smaller cities (with populations under 600,000) performed as their European counterparts do the gain would be less pronounced with an additional 340,000 workers using public transport respectively.[6] These figures suggest that there are significant opportunities to increase public transport use in the UK's biggest cities. The purpose of this research is to look at lessons from around the world regarding measures that have been taken to drive up public transport ridership that could be applied here. The research looks across seven policy areas and considers both 'carrot' and 'stick' approaches to improving ridership levels. These are then used to inform policy recommendations designed to encourage greater bus, tram and train usage in the UK.

6 These estimates are based upon the current number of working people for UK cities from the annual population survey (June 2023) and the share of commuting by public transport from Census 2011. Hybrid working is likely to have changed working patterns so this is a daily upper estimate. While this data looks at public transport use it does not consider active travel use due to Eurostat not providing active transport figures. Out of the UK cities included Bristol has 22% of workers commuting by active transport, above the average for UK cities.

02

How to increase public transport use

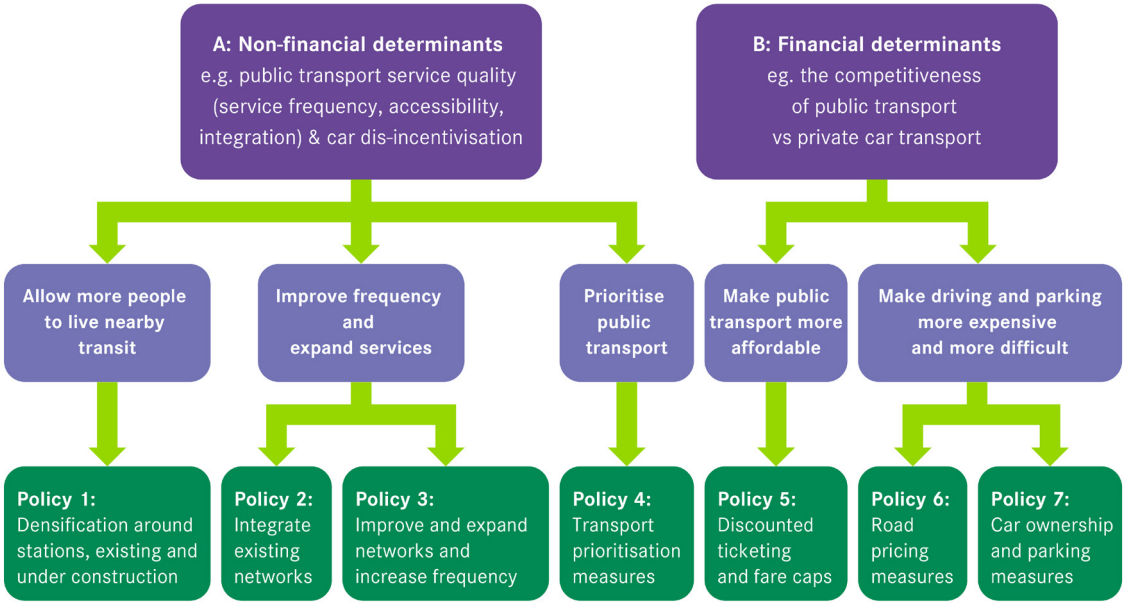
What makes people choose public transport?

To encourage modal shift, public transport must be a more attractive option than the private car. When evaluating any policies put in place, we should therefore focus on how they adjust the relative benefits of both.

The factors determining the competitiveness of public transport can be broadly split into two categories: financial and non-financial. If public transport is not the more competitive choice in both categories, policies to encourage modal shift are unlikely to succeed. Public transport must be both the more affordable and the more convenient choice.

Figure 2 outlines the factors determining mode choice and the competitiveness of public transport. A successful approach to public transport should consider the combinations of policies that will encourage modal shift. To create an effective strategy the 'A' actions on the left side of the model, based on non-financial factors, should be adopted in combination with the 'B' interventions on the right.

Figure 2: Factors determining the attractiveness of public transport



Non-financial determinants

If we consider first the non-financial factors contributing to modal shift, a good starting point is to remember that the key advantage of the car is its convenience. Therefore, to offer a compelling alternative, public transport also needs to be convenient. In practice, this means creating systems with frequent services that are integrated with other connecting services and reliably serve destinations to which people wish to travel.

Policies to help achieve this include better coordination and integration of different modes of public transport, prioritising public transport over other traffic to increase speeds and reliability, and increasing the number of people living around stops and stations.

Enable more people to live near public transport

Maximising the number of people who can easily access a public transport network and creating a viable system is not just about network coverage and service frequency. Greater demand for public transport can be brought about by developing and increasing the density of homes around transport stops, putting more people within reach of services.

Previous analysis by the Centre for Cities has shown this to be a key distinction between cities in the UK and elsewhere in Europe. While the coverage of public transport networks is lower in a number of UK cities, where services exist a

consistent difference between large cities here and those on the continent was found to be that the latter had many more people living within service catchment areas, so making public transport accessible to more people.[7]

Policy 1: Densification and development around stations and stops

Improved and expanded networks (see Policy 2 and Policy 3) or discounted fares (see Policy 5) are unlikely to significantly reduce car trips in low population density areas. Despite improvements to accessibility and affordability, frequency of service and destination choice will not be sufficiently convenient to persuade people out of their cars unless large subsidies are given to service providers, in turn undermining the financial viability of a system.

Therefore, alongside improvements to transport, there should be a push in the UK's large cities to increase the number of people who live close to stops on existing networks.

There are several examples where cities have brought transport and housing together as they expanded their networks. Lille has a successful history of transit-oriented development (TOD) around its city centre and in the suburbs (see Case Study 1) and has enacted a policy known as 'DIVATs' (Disque de Valorisation des Axes de Transports). These are 500 metre zones, with a tram station at the centre, where special planning measures are put in place including specifying minimum densities and an emphasis on mixed-use development and active transport.[8]

Increasing the density of property development can be an important revenue source for public transport. The funding model for Hong Kong's Mass Transit Railway (MTR) allows the system operator to develop the land around new stations. In 2019, for every pound collected from tickets, a further 60p came from either property rental and management or commercial businesses using stations.[9, 10] Montreal has used a development tax to capture the value created by the expansion of its new light rail network, as discussed in Case Study 2. This can work in the UK too: Tax Incremental Financing (TIF) has been used as part of the recent Battersea and Nine Elms extension of the London Underground Northern line (see London case study).

7 Rodrigues G and Breach A (2021), Measuring up: Comparing public transport in the UK and Europe's biggest cities, London: Centre for Cities

8 JLL (2021), City Region Connectivity Appendix: Key Case Studies

9 Rodrigues, G (2022), TfL could learn from Hong Kong's public transport funding model, London: Centre for Cities

10 MTR Corporation Limited (2022), Annual Report: Ten-Year Statistics, Hong Kong

Case study 1: Transit-oriented development, Lille Metropolitan Area

A successful policy of increasing the density of surrounding property was applied during construction of Lille-Europe station in 1994 and improvement of the existing Lille Flandres city station. However, this policy has since been extended outside the central area.

Armentières, a suburb of Lille, is a once-successful commercial area which suffered from deindustrialisation. As part of urban renewal efforts beginning in 2006, a deserted zone around the railway station was redeveloped with an intermodal transport hub alongside commercial and residential space.

The station has been improved with a new forecourt opening on to the city centre, a sheltered bus interchange and a 450-space car park to encourage park and ride journeys. Bus and bike lanes have been constructed to help passengers switch between transport modes. These changes were accompanied by the launch of intermodal ticketing, allowing users to travel by train, bus and bike share across Lille with the same ticket and daily fare caps.

Residential density for the 800-metre zone around the station is now 39 residents per hectare, compared to an average density of 18 inhabitants across the surrounding metropolitan area.[11]

As a result of these efforts the number of passengers using the station has increased from 3,300 per day in 2005 to more than 5,000 in 2012, making it the second busiest regional rail station in the metropolitan area after central station Lille-Flandres.

In the 800-metre zone around the station the share of journeys taken by public transport is four times higher than the surrounding urban area with the number of car journeys below the metropolitan average. This is particularly notable considering that the wider urban area of Armentières has seen a fall in the share of journeys taken by public transport alongside one of the largest increases in car journeys in the area.[12]

The underlying success of these densification projects and the wider rejuvenation of Lille is down to strong political intervention, local freedom

11 Liu L and L'Hostis A (2014), Transport and Land Use Interaction: A French Case of Suburban Development in the Lille Metropolitan Area (LMA), Transportation Research Procedia, Volume 4, Pages 120-139

12 Liu L and L'Hostis A (2014), Transport and Land Use Interaction: A French Case of Suburban Development in the Lille Metropolitan Area (LMA), Transportation Research Procedia, Volume 4, Pages 120-139

to make spending decisions and large financial resources. The Versement transport tax (a regional transport tax on employers' payrolls) alongside waste collection taxes, retaining a share of VAT, and fees from public transport and water treatment, mean that the Lille metropolitan authority raises 78 per cent of its own budget, giving it considerable autonomy to invest in these densification projects.

Case study 2: Land value capture, Montreal, Canada[13]

The *Reseau Express Metropolitan* (Express Metropolitan Network or REM) is an automated light rail system that is part funded by land value capture. Announced in 2016, phase one opened in September 2023 with construction scheduled to finish in 2027. When complete the system will have 26 stations and 42 miles of track.

CA$600 million (€443.49 million) out of the project's total budget of CA$6.9 billion (€5.11 billion) is expected to come from a land value capture scheme based on property development charges.[14] A tax of CA$10 (£8) per square foot of floor area will be levied on developers for all new construction within a radius of 500 to 1,000 metres from the REM stations over the next 50 years.[15]

The scheme has faced some local resistance with residents living around the first phase of the route opposing higher density development.[16] This is expected to be less of an issue for other parts of the network. Planning bylaws in areas where the network is still under construction permit high density development and the route goes through former industrial land in Eastern Montreal rather than residential areas. [17,18] This experience shows how the success of any policy greatly depends on the context that it operates in.

13 Siemiatycki M, Fagan D and Nutifafa Arku R (2023), Land Value Capture Study: Paying for Transit-Oriented Communities, Infrastructure Institute

14 Knowles RD and Ferbrache F (2019), Introduction to Transit Oriented Development and Sustainable Cities: Economics, Community and Methods,Transit Oriented Development and Sustainable Cities, p1- 10. Cheltenham: Edward Elgar Publishing.

15 Observatoire Ivanhoé Cambridge de l'Université de Montréal (2022), Sharing competencies and risks Réseau Express Métropolitain de Montréal: a comparative study.

16 Kramberger A (2023), Like it or not: REM densification is coming to West Island,The Montreal Gazette.

17 Bergeron, M (2023) Densification urbaine: 50 nuances de gris et bisbille, La Presse.

18 Magder J (2023), Montreal urged to densify housing at hearings for Urban Master Plan, The Montreal Gazette.

Increase frequency and expand existing services

There are significant gains to be made by integrating and improving existing networks in the UK. For example, recent research by Centre for Cities found that around 300,000 more people could reach Glasgow city centre easily if the existing public transport network – heavy rail, subway and buses – was better integrated and had more frequent services.[19]

Policy 2: **Integrate existing networks**

Walking to and from transport stops, waiting and transferring are all viewed as more onerous than riding by many passengers.[20] The deregulation of bus services in 1986 in most parts of the UK introduced competition but also created a more fragmented system. Although partnerships between local authorities and transport operators across some areas have successfully improved integration between networks (see Policy 3), more can be done to ensure passengers can switch between modes quickly and easily to reach their destination.

Integration of services offers the opportunity to improve the performance of existing transport networks by making the transfer between modes seamless and simplifying fare structures. The aim of integrating services should be to minimise travel times to key destinations for the largest possible number of passengers.

There are several examples around the world where better integration of services has seen public transport use increase significantly. Often this is linked to the introduction of smartcards.

Switching from cash to smartcard or contactless-based payment helps to reduce dwell times at bus stops which account for between 25 to 30 per cent of travel time in urban settings. If this dwell time is halved overall bus journey times can be reduced by up to 10 per cent.[21]

New York introduced its MetroCard in 1993, allowing travel across buses and subways with a single ticket. This contributed to a 36 per cent increase in ridership on buses and subways between 1995 and 2005 while the population increased by only seven per cent. The immediate effects were more pronounced for bus ridership with overall bus patronage up 40 per cent and rail ridership increasing by 17 per cent during this period[22] while weekday subway ridership

19 Coombes M and Rodrigues G, Miles better: Improving public transport in the Glasgow City Region, London: Centre for Cities
20 Zimmerman S and Fang K (2015), Public Transport Service Optimization and System Integration, Washington: The World Bank.
21 Professor Begg D (2016), The Impact of Congestion on Bus Passengers, London: Greener Journeys
22 Booz & Company (2009), The Benefits of Simplified and Integrated Ticketing in Public Transport, London: Booz & Company

grew just 17 per cent.[23] The impact of the MetroCard was significant in suburban areas too. Ridership on the Metro-North and the Long Island Rail Road grew by 14 per cent relative to a suburban population increase of 6 per cent. This data suggests that bus rides to subway stations replaced car journeys.

More recently, Portugal integrated existing public transport modes and operators into a single ticket with a monthly price cap designed to incentivise take up. The effect of the policy has varied across the country; Lisbon has experienced a fall of 1.7 per cent in car trips to the city centre and train journeys between the suburbs and city centre increased 25.7 per cent between March 2019 and February 2020.[24] The improvements made to public transport integration have been complemented by policies to discourage driving into the city centre such as road pricing and parking levies (see Policy 6 and Policy 7).

Passengers are sensitive to both the total fare for a journey and the number of times a ticket must be purchased. Integrating a transport network allows clearer and simpler pricing structures and the introduction of fare caps where a journey involves transferring between modes. When an integrated zone-based fare system with free transfers was introduced in Haifa, Israel, single ticket sales jumped by 25 per cent over the first year following integration. Fare box data indicated an increase of 7.7 per cent in passenger trips and 18.6 per cent in boarding (one passenger can board multiple buses over the course of a single journey). The number of passengers boarding per trip went up from 1.38 to 1.52 indicating that people were making use of the free transfer option and travelling across a wider range of routes. This simplified fare system is thought to have contributed to reversing a downward ridership trend.[25]

Effective integration requires a management organisation or operator at a suitable regional level. This is a theme that runs through the case studies in this report including that of Translink in south east Queensland.

23 Booz & Company (2009), The Benefits of Simplified and Integrated Ticketing in Public Transport, London: Booz & Company
24 Rodrigues G (2021), What can British cities learn from the Portuguese public transport system?, London: Centre for Cities
25 N Sharaby and Y Shiftan (2012), The impact of fare integration on travel behaviour and transit ridership, Transport Policy Volume 21, May 2012, pages 63-70

Case Study 3: Translink, South East Queensland, Australia

Translink covers a coastal region in eastern Australia. It serves a population of 3.8 million, 90 per cent of which is based in three cities - Brisbane (2.6 million), the Gold Coast (600,000) and the Sunshine coast (400,000).

Prior to 2004 there were 18 different operators running public transport, including trains, buses and ferries, in Queensland. After being set up at a cost of AUS$35.9 million (£33.5 million at today's prices) Translink gained control of setting fares and launched a new integrated ticketing system. This organised the public transport network into eight zones based on concentric circles around central Brisbane. Passengers are now charged according to which zone they travel to and from regardless of the mode or modes of public transport used to complete their journey.

In 2008 Translink introduced smart ticketing with a Go Card on which ticket credits could be stored. In 2019, Cubic, the company behind the London Oyster and New York Metro cards, signed a contract to oversee the introduction of contactless card payments on Translink services.

Since then, smart ticketing has been widely adopted by passengers; by 2015 it accounted for 85 per cent of journeys made by public transport. This is partially due to lower prices for Go Card fares than comparable paper tickets as well as off-peak discounts only being available on Go Card.

Although Translink has used a range of policy levers to encourage public transport use, integrated ticketing has contributed to sustained growth. Analysis by Booz and Co. attributes a 3.5 per cent increase in ridership directly to the integration of ticketing.[26]

26 Streeting M and Barlow R, Understanding key drivers of public transport patronage growth - recent South East Queensland experience, Booz Allen Hamilton.

Policy 3: Improve and expand networks and increase frequency

The frequency, reliability and availability of routes is a significant factor in encouraging public transport use. Infrequent and unreliable services make public transport less attractive and prompt would-be users to choose to travel by car.

Bus franchising is one way to improve service levels as it allows local authorities or transport bodies to specify routes, service frequencies and fares rather than, as is the case with a commercially run network, basing decisions on these factors solely on the commercial viability of a route.

Having control of the bus network also means that local authorities can cross-subsidise services with revenue from more profitable routes supporting those which may not be commercially viable but which are seen as being important for connecting communities. This 'big picture' approach towards planning an integrated network also allows cross-subsidy between modes - for example, Transport for London uses revenue from the Underground rail system to subsidise the bus network - and allows transport authorities to draw on other revenue generation mechanisms (see Policy 6 and Policy 7). London's experience of bus franchising in the early 2000s (see London case study) went on to influence franchising in Singapore, as outlined below.

Improvements to services can be delivered without franchising. In England, Enhanced Partnerships – like Bus Service Improvement Partnerships in Scotland and Welsh Bus Partnerships – see operators and local authorities work together in a more incremental approach to improving service standards. Unlike franchising, these initiatives do not allow local government to set routes or remove contracts if operators are underperforming.

Brighton and Hove Council cites its partnership with local operators as the reason for having the highest bus use per head outside London and for bringing into service a new fleet of low emission vehicles. The partnership agreement has been able to achieve increased service frequencies and further bus priority measures, real-time information and improvements to ticketing.[27]

To supplement commercially run networks local authorities have sometimes chosen to operate their own bus routes. For example, Swansea's local authority runs its own subsidised routes to complement the commercial network.[28] However, such routes can be vulnerable to budget pressures where a local authority needs to free up resources to pay for essential services. This was the

27 Department for Transport (2021), Bus Back Better, National Bus Strategy for England, London: the Stationery Office
28 For further details, see: https://www.swansea.gov.uk/article/18212/Bus-information—subsidised-bus-routes

case in 2023 when Bath and North East Somerset Council cut a number of routes and replaced some others with Demand Responsive Transit, where passengers book mini-buses to take them to privately operated routes.[29]

Municipal bus companies remain an option for network expansion. While England's Bus Services Act 2017 makes it illegal to establish a municipal bus company, Scotland's Transport Act 2019 will allow the formation of municipal bus companies. Any Scottish city examining this route should consider whether the municipal bus company would operate as a sole operator, part of a competitive market or as part of a franchised network. Providing a service alongside commercial bus operators can prove a challenge; for example, Edinburgh city-owned Lothian Buses had to undergo significant restructuring after substantial losses in competitive 'bus wars'[30]. Establishing a municipal bus company also requires significant capital and revenue investment.

While there are a handful of municipal bus companies that withstood bus deregulation in the 1980s and still operate in the UK, including in Edinburgh, Reading and Nottingham, they too face pressure from constrained local authority budgets. For example, Halton Transport ceased operation in 2020 after falling into debt.[31]

Case study 4: Bus contracting model, Singapore[32]

In 2016 Singapore's Land Transport Authority (LTA) took over bus planning and setting fares from individual operators following the model used by Transperth, Australia and quality incentives used in London. The market had previously operated as a duopoly between SBS Transit and SMRT Buses until their contracts expired in 2016. The aim of the change in operating model was to increase services (and therefore ridership) and to keep fares low. Under the commercial operating system operators felt that this was not commercially viable.[33]

The new system means there is no revenue risk for operators. Operators collect fares but hand this revenue direct to the LTA. They are paid according to the reliability of services with vehicles tracked by the authority to monitor this. A competitive tendering process has increased competitiveness with new operators entering the bus market and performance levels increasing across both existing and new operators.

29 Wimperis J (2023), The bus shake-up hitting Bath and North East Somerset next week – explained, Yeovil: Somerset Live
30 Kinnburgh M (2001), Bus wars to be investigated, Edinburgh: BBC News
31 McKeon C (2021), New questions surround collapse of Halton Transport, Liverpool: Liverpool Echo
32 Elangovan N (2019), The Big Read: Bus contracting model has benefited drivers, commuters – but will the good times last, Singapore: M Today
33 Public bus operations in London and Singapore: A note on legal basis and contractual models, New York: Institute for Transportation and Development Policy

Using this model, the LTA has introduced higher frequency requirements for operators: targets were upped to require all bus services to run at intervals of not more than 15 minutes with feeder services every six to eight minutes. There are also benchmark reliability targets for each route. Exceeding these targets can mean bonuses up to 10 per cent of contract value for operators while payment can be reduced by up to 10 per cent if the operator misses their targets.[34]

As a result of these new frequency requirements ridership has steadily increased; up from 3.94 million daily trips in 2016 to 4.10 million in 2019. Further benefits for the city include a 25 per cent reduction in waiting time for 292 high-frequency buses while 75 per cent of bus services are less crowded during peak hours.

Under this model government subsidy is still required. In 2018-19, the operating cost - paying the bus company contracts and maintaining assets - was s$1.925 billion (approximately £1.4 billion in today's prices.) Fare revenue totalled s$834 million (approximately £614 million in today's prices) meaning that government grants had to cover the remaining s$1.024 billion (approximately £750 million in today's price), which is more than half the operating cost.[35]

Singapore is also able to raise revenue through its road pricing and car ownership measures (see Policy 6) which helps create a low-congestion, efficient - and therefore cost-effective - environment in which to run bus services.[36]

Prioritise public transport

Giving public transport priority over other traffic both increases its speed and reliability while reducing the convenience of private transport. Bearing in mind the value that passengers attach to service speed, frequency and reliability,[37] this has the potential to increase ridership and contribute to a virtuous cycle of greater demand, raising revenue and service provision while simultaneously reducing the number of cars on the road.

34 Interview with Go Ahead Singapore, September 2023
35 Elangovan N (2019), The Big Read: Bus contracting model has benefited drivers, commuters – but will the good times last, Singapore: M Today
36 Interview with Go Ahead Singapore, September 2023
37 Begg D (2016), The Impact of Congestion on Bus Passengers. London: Greener Journeys.

Policy 4: Public transport prioritisation measures

Passengers value journey time and reliability. A quarter of non-bus users cite long door-to-door journey times as their main reason for not opting for the bus and a further 18 per cent feel that buses are not reliable enough.[38]

Bus journey times have risen by, on average, nearly one per cent per annum in the UK. As a result, over the past 50 years bus journey times have increased by almost 50 per cent in congested urban areas. This contributes to a downward spiral for bus services: slower speeds increase journey times and reduce reliability while higher operating costs push fare prices up. As fewer people choose to travel by bus (for these reasons) services decline further.[39]

It has been estimated that if bus frequencies are maintained, every 10 per cent decrease in operating speeds leads to an 8 per cent increase in operating costs. If this is passed on to passengers through higher fares, estimates suggest there is a 5.6 per cent fall in patronage. If operators choose to reduce service frequency, a 10 per cent deterioration in operating speeds would lead to a 10 per cent reduction in frequency and five per cent fewer passengers.[40]

There are numerous examples of public transport prioritisation measures across the UK. Bus priority lanes have been used, including in Edinburgh (see Case Study 5), but also guided busways in Manchester as part of the Cross-City package. This includes a seven-kilometre guided busway, as well as restrictions to general traffic on Oxford Road between 06:00 and 21:00. Following its introduction, the journey time by bus between Leigh and Manchester city centre has reduced from 60-90 minutes to a consistent 50 minutes.[41] An estimated 20 to 25 per cent of those using the busway previously made the journey by car.

However, what is clear from examples from the UK and the rest of the world is that enforcement and maintenance of bus priority measurements are key. These measures should not be viewed as 'quick fixes' but long-term traffic management tools.

38 Pain R (2023), Motivations and barriers to bus usage, London: Transport Focus
39 Begg D (2016), The Impact of Congestion on Bus Passengers. London: Greener Journeys.
40 Begg D (2016), The Impact of Congestion on Bus Passengers. London: Greener Journeys.
41 Transport Scotland (2019), Greater Manchester Bus Priority Case Studies, Glasgow: Transport Scotland

Case study 5: Bus priority lanes, Edinburgh

Edinburgh's Greenways, introduced in 1996, provide one example of a high-profile bus priority measure. The lanes, which have green tarmac surfaces, are restricted to buses between 07:30-09:30 and 16:00-18:30 on weekdays with some restrictions also applying on Saturdays between 08:30-18:30. The aim was to prevent bus speeds declining during peak times.

The bus priority restrictions were initially enforced by traffic wardens and it was estimated that private vehicles using Greenways during operational hours were 15 times more likely to be caught compared to driving in a conventional bus lane.[42]

It has been estimated that, because of Greenways, bus speeds improved by five per cent during the morning peak at the same time as other UK cities saw bus speeds decrease. There was also an increase in the reliability of services using Greenways which was not matched for conventional bus lanes in Edinburgh.[43]

However, Greenways have since seen their effectiveness decline. This has been linked to a decline in enforcement with over-reliance on cameras to deter car drivers. A lack of maintenance has resulted in sections of lane losing their green colour which has reduced awareness among drivers of the existence of the bus priority measures.[44]

Financial determinants

While the policies above have focused on improving the value that a public transport system delivers to shift the non-monetary benefits of public over private transport, clearly the difference in monetary costs is an important consideration for many people. Policies that have been used to make public transport financially more attractive include ticket price reductions and interventions to make private car use more expensive.

42 Begg D (2016), The Impact of Congestion on Bus Passengers. London: Greener Journeys
43 Scottish Executive (2004), A Comparative Evaluation of Greenways and Conventional Bus Lanes, Report number 83
44 Begg D (2016), The Impact of Congestion on Bus Passengers. London: Greener Journeys

Make public transport more affordable

Policy 5: **Discounted ticketing and fare caps**

Post-Covid, discounted ticketing policies such as Germany's €9 train tickets[45], Japan's 'Go To Travel' scheme[46] and free commuter rail tickets in Spain[47] have made headlines and been heralded as ways to encourage people back on to public transport. Meanwhile in the UK bus fares are capped at £2 until November 2024.[48] This is understandable – fare reductions, especially during a cost-of-living squeeze, are eye-catching.

Schemes like those in Germany and Spain proved popular with passengers. In Germany around 38 million people used the scheme – nearly half the population – and as many as one in five Germans said they used public transport regularly for the first time following the introduction of the monthly pass. During summer 2022, while the scheme operated, there was a 42 per cent rise in train journeys compared to 2019 with an 80 per cent rise in travel to tourist destinations.[49] In Spain, discounted ticketing prompted an increase in usage of around 35 per cent, restoring passenger numbers to 95 per cent of pre-Covid levels.[50]

However, if the aim is to encourage long-term modal shift, governments and operators should approach discounted ticketing schemes with caution for the following reasons:

1. These schemes come with a hefty price tag. Germany's €9 ticket scheme cost around €2.5 billion to implement and Spain's around €700 million.[51]
2. The impact on modal shift remains unclear. In Germany data suggests the scheme generated additional demand without significant modal shift: whilst rail ridership increased by around 40 per cent between June and August 2022 it reverted to 2019 levels from September.[52] There are also concerns that free public transport shifts people from active transport while the impact on car usage remains marginal and is often offset after a few years of traffic growth.[53]

45 Quinio V (2022), What can we learn from Germany's €9-a-month public transport scheme?, London: Centre for Cities
46 Ministry of Land, Infrastructure, Transport and Tourism (2020), Go To Travel Campaign https://www.mlit.go.jp/kankocho/page01_000637.html
47 Geerts E (2023), Spain greenlights extension of free train passes until year-end, Railtech.com.
48 Department for Transport (2023), Guidance: £2 bus fare cap, London: Department for Transport
49 Posaner J, Preussen W and Gehrke L (2022), Last call for Germany's €9 ticket to ride, Berlin: Politico EU
50 Augusteijn N (2022), Spain's free train pass pushes use of public transport to pre-corona levels, Railtech.com
51 Le Monde (2022), Spain's government plans to extend free train travel into 2023, Paris: Le Monde
52 Engler J and Rusche C (2023), The Economic Impact of the 9-Euro-Ticket, IW Trends, Volume 50, Issue 1, p3-21
53 Fearnley N (2013), Free Fares Policies: Impact on Public Transport Mode Share and Other Transport Policy Goals, International Journal of Transportation 1(1):75-90

3. The ridership gains tend to be short term, lasting for the duration of the discount, as passengers only view the fare reduction as 'good value' initially, then view the new fare as the norm. Evidence from short-term free public transport trials shows that any ridership increases dissipate after removal of the financial incentive.[54] A flat fare also means that only longer journeys are viewed as being 'good value'.
4. Discounted ticketing policies do not consider increased operating costs, putting the longer-term sustainability of transport networks at risk.
5. Discounted ticketing policies may overwhelm network capacity, reducing perception of the network's effectiveness by those who use it regularly. The popularity of Germany's discounted ticket scheme resulted in overcrowding on trains and stations which risks deterring existing users.[55]
6. Finally, discounts alone are unlikely to result in a long-term change in travel habits if cars remain the more convenient option. A 2023 Transport Focus survey in the UK found that 27 per cent of former regular bus users would be encouraged to use the bus again through 'better value' fares but among people who had never used buses more frequent services were more important than 'better value'. Only 10 per cent of people not currently using buses said that the £2 capped fare scheme would encourage them to travel by bus.[56]

From these experiences we can see that any discounts to fares need to be accompanied by improvements to public transport – for example quicker or more frequent journeys – or by measures to make car ownership and driving less appealing (see Policy 6 and Policy 7 below) if they are to bring about long-term change.

Barcelona is an example of a city which has implemented discounted ticketing in conjunction with other policies aimed specifically at reducing car ownership. This is explored in more detail in Case Study 6.

54 Zeiske N, van der Werff E and Steg L (2021), The effects of a financial incentive on motives and intentions to commute to work with public transport in the short and long term, Volume 78, p1-8
55 Dahim J (2022), German rail overcrowded after €9 ticket launch, Euractive
56 Transport Focus (2023), Motivations and barriers to bus usage, London: Transport Focus

Case study 6: T-Verda card and car disincentivisation policies, Barcelona

The T-Verda card is a travel pass that was introduced in Barcelona in 2017 to encourage modal shift by giving free transport to anyone who gives up an older polluting vehicle. It is particularly interesting in the UK context given the recent controversy surrounding London's Ultra Low Emission Zone.

The card grants holders free travel by public transport for three years in zones 1 and 6 of Barcelona's metropolitan area on the condition that the passholder decommission their car or motorcycle and commit to not buy one for the three years covered by the pass. It only applies to cars without an environmental certificate – petrol cars manufactured before 1997, diesel cars sold before 2006 and pre 2004 motorcycles.

Over 12,000 passes were issued between 2017 and 2021 of which half were issued between 2020 and 2021. In 2020 it was estimated that 50,000 vehicles were classed as polluting vehicles under the T-Verda and low emission scheme. Therefore, the scheme represents a possible reduction in polluting vehicles of 24 per cent.

This 'carrot' has been accompanied by 'stick' policies which have encouraged take up. These include:

- A low emissions zone (LEZ). An uptick in pass applications in November 2020 coincided with the announcement of a low emissions zone operating from Monday to Friday from 7:00 to 20:00 – 729 applications were received during this month of which 595 were approved.

- Converting 121 intersections in the city into 'superblocks' - 400 square metre blocks of land within the city into which vehicles are not permitted to enter.

Between January and June 2018, the 2,283 users of the T-Verda card made, on average, 35 trips per month each. The ratio of trips to user is similar to that of other tickets which suggests it is being used for everyday mobility.[57] The cost of providing T-Verda cards has amounted to between €95,000 and €200,000 in each year since the start of the scheme,

57 For further details, see: https://www.interregeurope.eu/good-practices/green-ticket-t-verda-metropolitana

significantly cheaper than 'blanket' ticket discount schemes.[58]

While LEZs in the UK, such as London and Glasgow, have been accompanied by scrappage and vehicle retrofit schemes for individuals and businesses, aimed at improving compliance and reducing pollution, this kind of discounted ticketing has significant potential to encourage longer-term modal shift because it mandates changing transport modes rather than the upgrading of a private vehicle.

Make driving and parking more difficult and expensive

Part of the policy approach to making public transport more competitive is to make private transport less attractive. Charging drivers to use roads and to park their cars, as well as limiting the supply of parking spaces, are all approaches that have been taken in cities in the UK and abroad.

Policy 6: **Road pricing measures**

One way to make driving less attractive is to charge drivers for road use. **Congestion charging levies** a charge on vehicles entering a specific area (usually the centre of a city) to deter private car use and in turn reduce traffic congestion. London's congestion charge is well known but similar approaches have been adopted in Stockholm and Milan.

Increasing car parking charges has been shown to reduce driving in particular areas. In Amsterdam city centre a parking price increase of 65 per cent in 2019 led to demand for parking falling by around 17 per cent. This reduction in demand implies a 2-3 per cent reduction in traffic.[59]

Clean air zones are another application of road pricing. Here the focus is on reducing vehicle emissions rather than cutting traffic congestion and charges tend to be limited to a smaller number of non-compliant vehicles. London's Ultra Low Emission Zone has attracted plenty of attention but clean air zones exist in

58 For further details, see: https://www.amb.cat/en/web/amb/govern-metropolita/economia-i-inversions/gestio-pressupostaria

59 Ostermeijer F, Koster H, Nunes L and Ommeren J (2022), Citywide parking policy and traffic: Evidence from Amsterdam, Journal of Urban Economics, Volume 128

various forms in other UK cities including Bath, Birmingham and Glasgow.

Road user charging is a more sophisticated approach. It charges drivers for use of specific sections of road and dynamic pricing reflects the distance travelled or specific route, time of day and vehicle type rather than applying a fixed fee. This approach typically raises more revenue than a flat-rate charge and can be used to control traffic flows in a city. Singapore has implemented such a policy, discussed in more detail in Case Study 9.

One challenge for all these approaches is their cost of implementation. In the UK London spent an initial £81 million to set up the congestion charge with a further £80 million needed for road traffic measures. This is important because there is not always a clear payback date. In London £115 million was raised in the first year of the congestion charge going live with £55 million of this coming from penalty fines on unpaid charges. However, as compliance increases, revenue falls. In the second year of the London congestion charge only £102 million was collected. Securing initial set up costs for similar initiatives may prove difficult without central government subsidy given that it is not clear how quickly this money can be recouped.

Introducing any form of road pricing can be politically difficult - as the experiences of Manchester and Bristol have shown - so it is important for city leaders to build and maintain public support for these policies. This could include awareness campaigns to make clear the purpose of a policy and highlight the negative impacts of congestion and air pollution, or tangible improvements to public transport that coincide with the introduction of road pricing policies. An example of this can be seen in the London case study below.

Another example can be seen in Ljubljana, Slovenia.[60] As part of the city's 2012-2020 'Sustainable Urban Mobility Plan' (SUMP) the city centre has been closed to private traffic and deliveries are only allowed before midday. Mayor Zoran Jankovic chose to implement these controversial changes during his first year in office with the aim of allowing residents and critics of the policy to see the benefits before the next election. He has since been re-elected three times.

As a result of these policies and complementary improvements to public transport such as the introduction of smart ticketing, real-time travel information displays, new buses and five new park-and-ride facilities, the city experienced an 18.5 per cent increase in public transport use between 2010 and 2014.

60 For further details, see: https://www.ebrdgreencities.com/policy-tool/pedestrianisation-and-car-free-zones-ljubljana-slovenia-2/

Policy 7: Car ownership and parking measures

Workplace parking levy

Road pricing in the forms set out above does not cover stationary vehicles or directly discourage car ownership. Under a workplace parking levy car parking spaces in a city are licensed and a charge is payable to use them. Revenue from the levy is then used to fund public transport. Businesses with fewer than ten spaces are usually exempt to reduce the impact on small businesses and the administrative burden for councils.

One advantage of a workplace parking levy is that, unlike congestion charging or road user charging, it does not require significant up-front investment beyond creating a database of parking spaces. This makes it a cost-effective policy lever.

In the UK, Nottingham has pioneered the introduction of a workplace parking levy and, by demonstrating a feasible model, has given areas considering a similar approach a clear idea of the costs and risks involved. Case Study 7, below, discusses Nottingham's approach in more detail. Sydney has had a workplace parking levy since 1993 but, unlike Nottingham, it has two different zones in which different charges apply. The Sydney scheme raises around AUS$100 million (£50 million) a year and this revenue has helped to fund light rail projects and new bus interchanges.

Financial start-up costs may be low but local politics can prove an obstacle to those hoping to introduce a workplace parking levy. For example, proposals in Bristol were abandoned because of opposition from business. While the charges imposed on drivers by a parking levy are tangible, the costs to society of congestion and pollution are much less so. Therefore, any plan to introduce such a policy will need to effectively communicate these intangible costs if it is to persuade communities why the introduction of a workplace parking levy is a step forward.

Case study 7: Nottingham's workplace parking levy

The workplace parking levy in Nottingham was established in 2012 using powers contained within the Transport Act 2000. It took Nottingham City Council from 2000 to 2009 to get the workplace parking levy scheme order approved before charging commenced in 2012. It remains the only city in the UK to have implemented a workplace parking levy to date.

The cost per workplace parking place for 2023-2024 is £522 and is paid by employers who provide 11 or more spaces in the city.

Total set-up costs amounted to £1.8 million (funded by local and central government) and the scheme costs around £475,000 a year to run.[61] It has achieved 99 per cent compliance from employers with about half of firms passing on the cost of providing spaces to employees.[62]

It is estimated that, as a result of the workplace parking levy, congestion growth in Nottingham has been cut by 47 per cent. By September 2021 a total of 7,840 tonnes of carbon dioxide emissions had been averted since the levy's introduction. The levy has contributed to a 33 per cent fall in carbon emissions in Nottingham since 2005 and a further 350 tonnes of CO_2 have been saved through the introduction of 15 electric buses, paid for by the levy.

In total £83 million of revenue was raised from the levy between 2012 and 2022.[63] Some of this has been used to bid for other sources of match funding for transport investment in the city: for every £1 raised £3-4 of other funding has been secured.[64] The Department for Transport matched £221 million of local funding (which included income from the workplace parking levy) with £432 million to enable the extension of the city's tram network.

Parking policy - certificate of entitlement and 'proof of parking'

Cities can also target stationary vehicles through measures such as changing the minimum and maximum number of parking spaces for new developments, controlling on-street parking, or restricting car sales. While these do not necessarily raise money they offer another tool for discouraging car usage.

The number of parking spaces in central Amsterdam has been reduced in recent years to make it more difficult to park and to put the land to other uses.[65] Tokyo has a long history of regulating car ownership as Case Study 8 explores.

61 Friends of the Earth (2023), How Nottingham used a parking levy to cut congestion and raise millions, UK
62 Clayton N, Jeffrey S and Breach A (2017), Funding and financing inclusive growth in cities, London: Centre for Cities
63 Friends of the Earth, How Nottingham used a parking levy to cut congestion and raise millions, UK
64 Campaign for Better Transport (2017), A winning policy: Nottingham's Workplace Parking Levy, London: Campaign for Better Transport
65 O'Sullivan F (2019), A Modest Proposal to Eliminate 11,000 Urban Parking Spots, Bloomberg City Lab.

Case study 8: Parking policy in Tokyo, Japan

In 1962 Japan introduced its 'shako shomei' (proof of parking) policy that required anyone buying a car to prove that they owned or rented a parking space within two kilometres of their residence to local police.

The aim of the policy was to create and sustain a market for off-street parking. Given the lower availability of space in densely populated areas car owners pay more for parking in urban areas where land is expensive than in rural locations where land is more affordable. The policy also encourages people to choose smaller vehicles that fit a parking space on their own property; these cars have lower emissions than might otherwise be the case.

The policy is complemented by a ban on overnight parking in Tokyo which has been in force since 1957 with a penalty of approximately ¥200,000 (£1,090) payable by those found to have flouted the ban. On-street parking restrictions also mean that spaces can usually only be used for one hour. As a result, such on-street spaces are extremely rare – 95 per cent of Tokyo streets have no on-street parking.

This policy has contributed to lower car ownership in urban areas.[66] While rural areas see higher rates of car ownership Japan has lower car ownership overall compared to its international peers (1.06 cars per household in Japan compared to 1.24 cars per household in the UK). Tokyo has the lowest across the country of 0.52 cars per household.

The context for this policy is important. First, Japan's cities have been built at densities much higher than large UK cities. Traditional street layouts are narrow and land ownership is fragmented; this did not change significantly even during post-war reconstruction. Around 35 per cent of Japanese streets are not wide enough for a car to pass and 86 per cent are not wide enough for a car to stop without blocking the traffic behind it.[67] Second, the cost of owning a car is high due to an annual automobile tax, purchase tax and bi-annual inspections, similar to an MOT, costing around ¥100,000 (£550). Other motoring costs are high relative to other countries. For example, Motorway tolls in Japan are approximately three times higher than those in France.

The table below shows the population density and number of cars per household for the three largest UK and Japanese cities. Dense

66 Knowles D (2023), How Tokyo became an anti-car paradise, Heatmap
67 Knowles D (2023), Carmageddon, New York: Abrams Press

development around stations has been encouraged by Japan's zoning system and by rail companies which also act as property developers, creating urban areas where high numbers of people live close to stations.[68] These factors, along with an integrated ticketing system that allows seamless travel between different operators and modes, shift the balance of benefits between using public and private transport.

Table 1: Density and car ownership in selected Japanese and UK cities

Japanese or UK city	Population density/km² (Japanese data 2022, UK data 2021)[69]	Cars per household (Japanese data 2022, UK data 2021)
Tokyo	14,449	0.4
Osaka	9,995	0.4
Yokohama	4,473	0.6
London	5,596	0.8
Manchester	2,105	0.7
Birmingham	3,649	0.9

Singapore is an example of a city that has effectively combined both measures to discourage ownership with road pricing.

Case study 9: Road pricing and vehicle certificates, Singapore

Singapore is an extremely dense city-state and has long recognised the need to control car ownership, implementing measures to discourage car travel since the early 1970s. This includes Electronic Road Pricing (ERP) and a series of earlier road pricing policies.

The 1975 Area Licensing Scheme (ALS) required drivers to purchase a licence to enter the city centre at particular times of day. The scheme resulted in an initial drop in car numbers of 44 per cent, falling to 31 per cent by 1988. This overall fall was despite a 77 per cent increase in the number of vehicles in Singapore and employment growth of one third during the same period.

In 1995 the city also introduced a 'Road Pricing Scheme' (RPS) on one

68 JR East (2022), JR East's Real Estate Development Strategy, Tokyo: JR East
69 The data is based on used the city wards for each Japanese city.

expressway. This resulted in traffic volume decreasing from 12,400 vehicles in May 1995 to 7,300 vehicles in August 1995 during the restricted hours. Travel speeds increased from an average of 29kph to 64kph on the expressway.

These two policies succeeded in reducing congestion, raising speeds and promoting modal shift. The share of journeys made by public transport increased from 33 per cent before the ALS to 69 per cent after the introduction of the RPS.

The schemes were also cost effective. Revenue from the sale of ALS licences totalled s$47 million (around £61 million at today's prices) in 1993 while capital costs in 1989 were just s$1.7 million (around £3 million today). The policies did, however, displace congestion to peripheral roads and to times just outside of the ALS operating hours.

Electronic Road Pricing (ERP) was introduced in 1998 as the successor to the two earlier policies. It was intended to simplify the types and cost of licences available under the ALS and RPS, to reduce the costs of operating these manual systems, and to optimise road usage through more precise traffic control.

Under the ERP system vehicles are fitted with unique 'in-vehicle units'. Debit cards inserted into the units are automatically charged when a vehicle enters the charging zone.

The cost of introducing ERP has been estimated at s$200 million (£215 million at today's prices), half of which was used to buy and install about 1.1 million in-vehicle units. This is less than s$300 per vehicle (£258 today) based on the number of vehicles in the city at the time.

ERP charges vary according to time of day, vehicle size and specific route to ensure optimum road usage. Charges are reviewed at three monthly intervals and remain fixed for three month periods. Pricing increases or decreases depend on detected average speeds during a given half hour. For example, prices will be increased when a road becomes more congested and average speeds decrease in an attempt to reduce traffic on that route.

Public awareness campaigns ran for more than a year before the ERP was introduced and the cost of the in-vehicle unit installation was met by the government. This clear communication and removal of any financial burden on the individual were important success factors. The use of

ERP revenue to improve public and non-motorised transport has helped ensure support for the charging scheme.

Traffic volume in the central area of Singapore **reduced** by 10-15 per cent following the introduction of ERP in 1998.[70] There were **25,000** fewer vehicles in peak hours and average speeds went up by 20 per cent. Bus travel and car-pooling also increased.[71]

By the early 2000s, nearly 300,000 daily transactions were generating daily revenue of about £630,000 at today's prices, suggesting annual revenues of more than £230 million.[72]

ERP brought in about s$150m (£157 million at today's prices) a year in the early 2010s. This is about 20 per cent less than ALS revenue in the early 2000s due to lower ERP charges compared to ALS. This makes up around 10 per cent of the local transport authority's income, significantly higher than the 4 per cent raised by the congestion charge for Transport for London in 2019.[73]

Singapore's ERP is primarily designed to optimise road usage and reduce congestion; it raises minimal revenue compared to some of the city-state's other restrictions on car use. These include the 'Certificate of Entitlement' - a 10-year car ownership permit purchased by auction. There are a fixed number of permits available in order to cap the net increase in vehicle ownership at 3 per cent per year.[74]

In August 2023, the average cost of a Certificate of Entitlement for cars up to 1600cc was £60,000 (for a ten year permit) and higher for cars with larger engines.[75] Concessions are available for 'greener' vehicles. In 2021 revenue from all vehicles, Certificates of Entitlement and vehicular excise duty amounted to s$5.78 billion (£4.1 billion at today's prices).[76]

70 Theseira W (2020), Congestion Control in Singapore Discussion paper, International Transport Forum, Discussion Papers
71 For further details, see: https://www.ctc-n.org/technologies/road-pricing#:~:text=In%20Singapore%2C%20the%20ERP%20has,reduction%2C%20i.e.%20travel%20time%20savings
72 Phang S and Toh S (2004), Road Congestion Pricing in Singapore: 1975-2003, Transportation Journal
73 Rodrigues G (2022) Raising cash from car-restricting policies: What can London learn from Singapore?, London: Centre for Cities
74 Chin K (2005), Road Pricing – Singapore's 30 years of experience, CESifo DICE report
75 For further details, see: http://coe.sgcharts.com/
76 Tan C (2023), Budget 2023: Vehicle tax and COE revenue set to rise 4.6%, Singapore: The Straits Times

03

Implementation in the UK

London is the only UK city that has levels of public transport ridership comparable with its European counterparts. This is the result of a combination of policies that have been introduced over many years including many of the measures discussed above.

Key factors in London's success persuading people to use public transport include the creation of the Greater London Authority and an overarching transport strategy for the city, establishing Transport for London to manage and integrate the city's transport network, and improving public transport at the same time as disincentivising driving.

Specific policies implemented in London along with their effects are highlighted below.

Policy – Densification

The economic geography of London makes public transport more appealing than in other parts of the UK. Table 1 shows the density of people living in the city is higher than in other urban areas and an unusually high 47 per cent of its economy is located at the centre.[77] This means that up to 1.5 million people travel into central London on a typical workday, a volume of commuters that makes doing so via private transport largely impractical.

Densification is a key part of the London Plan. It recognises that densification supports businesses in clustering, maximising job opportunities and providing critical mass for social infrastructure. The plan also recognises that places best suited to high density property developments are those where "public transport options are available".[78]

An example is the Battersea and Nine Elms redevelopment. By using tax

77 Rodrigues G and Bridgett S (2023), Capital losses: The role of London in the UK's productivity puzzle, London: Centre for Cities

78 London Plan (2021) p15

incremental financing, the GLA has been able to fund the £1 billion cost of the London Underground Northern line extension to Battersea Power Station and Nine Elms. This has involved borrowing against anticipated business rate receipts in the designated area around the development.[79] On completion, 18,000 additional homes will be within 15 minutes reach of central London.

Over the next decade Transport for London, in partnership with Network Rail, plans to build an additional 20,000 homes around stations. A key advantage of London compared to other UK cities is that the local government structure brings transport and planning functions together for the entire city. As the Mayor of London can make both planning and transport decisions and does not require agreement from neighbouring authorities, it makes densification an easier policy to realise.

Policy – Integration

London's integrated transport system is partly due to the fact that while most of Britain deregulated local bus networks London was able to retain control and ownership of its services.

London's bus network of approximately 675 routes is franchised, allowing Transport for London to plan routes and set service levels. Underground rail and tram services are wholly managed by TfL while the London Overground, Docklands Light Railway and Elizabeth line are run by private operators with TfL specifying service levels. As a result, even though TfL does not operate all its own services, it is able to plan them strategically. Multiple modes provide opportunities for cross-subsidy; TfL uses revenue from its rail operations to support the bus network, which runs at a loss.[80]

This not only allows timetable integration between different modes but gives TfL the ability to provide multi-mode tickets with fare caps. This began with the Oyster card in 2003 but was expanded to support contactless payments in 2012. By this point Oyster cards were used for 80 per cent of all journeys made using public transport in London.

Policy – Prioritising public transport

TfL manages five per cent of London's road network and which accounts for 30 per cent of the city's traffic. While it wants to reduce delays for all road users the organisation also uses its traffic management remit to enhance its bus network.

The Mayor has recently announced an additional £10 million for the Infrastructure Coordination Service, which oversees roadworks carried out on the TfL road network. It is estimated that, since its launch in 2019, the service has reduced

79 Mayor of London (2022), Questions to the Mayor: Tax Increment Financing, London: Mayor of London

80 For 2023-24 it is expected that TfL's bus network, along with street and other operations, will run a deficit of £641 million but can be subsidised from other revenue streams. For further details, see TfL Board (2023), 2023/24 TfL Budget, London: TfL

the time taken to complete roadworks by 1,254 days.[81] That said, while public transport prioritisation can work (as highlighted in Case Study 5), it is important that these measures are properly maintained and are supported by other policies to reduce congestion.

Policy – Discount ticketing and fare caps

TfL can provide a daily and weekly cap on its services which applies across modes. This is a benefit of TfL having ownership of London's entire public transport system. The daily cap alleviates worries for users about overspending and reduces confusion regarding the cost of journeys.

No major discounted ticketing scheme has been introduced, but TfL offers a Hopper fare for bus users. This allows users to travel on an unlimited number of buses in one hour at no additional cost. Following the introduction of the Hopper fare it is estimated bus trips increased by 5 per cent with a rise of 8 per cent for follow up-journeys.[82]

Policy – Road pricing

London has been the first mover in the UK for road pricing. The congestion charge, inspired by Singapore's Electronic Road Pricing (see Case Study 9), was launched in 2003. It was expanded to West London in 2007 but this was reversed in 2011. The purpose of the scheme is to reduce congestion within central London which it has done by 30 per cent. It has also helped boost bus travel by 33 per cent in the two decades since its introduction.[83]

Importantly, the charge was rolled out alongside an expansion of the public transport network to make giving up car use more attractive. TfL created 300 extra bus routes to provide affordable alternatives to driving and to help mitigate opposition to the scheme.[84]

The Ultra Low Emission Zone (ULEZ) was introduced in 2019 and expanded to the North and South Circular roads in 2021 with a further expansion in August 2023. Rather than addressing traffic congestion the primary purpose of the ULEZ is to improve air quality across London. It is estimated that 95 per cent of vehicles across inner and outer London are now compliant with clean air standards, an increase of 56 per cent since 2017.[85]

Road pricing is not a reliable revenue generator because income declines as compliance improves. However, to encourage support for the congestion charge and counter claims of it being a money-making exercise, it is a legal requirement

81 BBC News (2023), London scheme to reduce roadworks impact gets £10m funding boost, London: BBC News
82 Offiaeli K and Yaman F (2023), The effect of an unconventional fare decrease on the demand for bus journeys: A regression discontinuity approach, Journal of Public Transportation, Volume 25
83 TfL (2023), Congestion Charge marks 20 years of keeping London moving sustainably, London: Transport for London
84 Badstuder N (2018), London congestion charge: what worked, what didn't what next, The Conversation
85 Tfl (2023), New report shows ULEZ expansion is working with 95 per cent of vehicles across inner and outer London now compliant with clean air standards, London: TfL

that any surplus revenue is ringfenced for sustainable transport investment.

Conclusion

London's success in encouraging people to use public transport has been achieved through a combination of different policies. By being able to exert greater control over its public transport network the city authorities have been able to integrate services successfully and provide multi-modal tickets with daily fare caps. Alongside this it has been able to encourage densification, and shift drivers from their cars to public transport. If the UK's largest cities are to equal their European counterparts in terms of share of commutes by public transport, a similar combination of policies used in London will be needed.

04

Policy recommendations

Large cities are well positioned to sustain an efficient and well-used public transport system because the density of property development not only creates demand but it makes investment feasible. Yet outside London UK cities have less extensive networks than their European counterparts and public transport use lags well behind. Addressing this disparity could increase annual public transport use in the UK by nearly one million passengers.

The Westminster Government has recognised this with the creation of the City Region Sustainable Transport Settlements that provide a decade of funding for large English cities to support investment in infrastructure. But this alone will not deliver a marked increase in public transport use.

There are a number of themes that emerge from the case studies presented above that national and local government should address in addition to looking at how to expand infrastructure. These include integration of services, the importance of empowered transport authorities, the requirement for property density, the need to raise revenues locally and focusing on overcoming difficult politics.

Plan for property density

Previous work by Centre for Cities has shown that the less dense urban form of large UK cities is a major factor in explaining why their public transport networks do not connect as many people to city centres as comparable cities on the continent do. This is likely to explain why levels of use are lower.

The success of all policies designed to increase passenger numbers will depend on the density of cities. To improve the underlying economics for public transport UK cities should, firstly, focus on developing city centre economies to increase the concentration of jobs. As more people commute into a city centre it becomes less practical to do so by car, increasing the relative merits of taking public transport. This explains why so many central London workers use public

transport to get to work.

Second, UK cities should use their powers to implement Local Development Orders to plan for mid-rise housing near existing and new public transport stops. This will be supported by national planning reforms currently set out in the Levelling Up and Regeneration Bill.

Third, putting in place a land value capture mechanism should be considered so that the public sector benefits from some of the financial uplift that an investment in public transport generates. In the UK, tax incremental financing has been used to capture growth in business rates from the Battersea and Nine Elms development. A similar result could also be achieved by a land value tax such as that used in Montreal.

Empower transport authorities

In many of the case studies above there is a single body responsible for running the public transport networks that are examined. Again, this is something that London, through TfL, has benefited from for over two decades.

Where similar bodies are already in place, for example Transport for Greater Manchester, these authorities should be given the same powers that TfL has. Where there is no body in place for a major urban area the Government should fund the creation of one.

Integrate services

Better integrated services make a public transport system operate more effectively. This includes having integrated ticketing and ensuring different public transport modes connect seamlessly with one another.

As a result of legislation that either has been or is about to be passed in both England and Scotland large cities across the UK now have the option to introduce bus franchising, a power London has long benefited from. Greater Manchester has started rolling this out and Liverpool City Region is set to follow. Bus franchising will open up the ability to fully integrate different modes of public transport. However, as franchising will require revenue and infrastructure funding support, cities should ensure the material benefits outweigh the costs, and cities, where commercial partnerships have not worked, should be prioritised.

Franchising will have further benefits, such as allowing transport authorities to borrow to invest and own data on a network's performance which can then guide where investments are made. Other large cities should take advantage of this opportunity.

Raise revenue locally

Revenue raising powers, such as congestion charging or workplace parking levies, are important for two reasons. The first is that they provide money to invest in public transport which can be spent either on infrastructure or on the cross subsidisation of services. The second is that they increase the cost of driving and so alter the relative benefits between public and private transport.

With this in mind national governments should give powers to local transport authorities to allow them to introduce congestion charging and workplace parking levies. This will soon be the case in Scotland.

Overcome difficult politics

Having powers to make substantive change is not the same as using them. Imposing charges on drivers is not politically easy – the rejection of congestion charging in Manchester via a referendum in 2013, the scrapping of workplace parking levy proposals in Bristol and more recently the political furore around the expansion of the ULEZ in London show this clearly.

Options here include:

- Making improvements to public transport networks before introducing policies that have a financial cost for residents to ensure they have an affordable and reliable alternative to driving.
- Publicising network improvements through campaigns and public engagement that make clear the benefits of new policies.
- Demonstrating how revenue raised from charging schemes will be used to improve public transport.

Be wary of discounted ticketing schemes

Changing the relative cost of public transport compared to private transport is one way to make public transport more appealing. However, while reducing ticket prices can attract attention, doing this without investment in the public transport service provided is unlikely to bring about long-term modal shift. Local and national government should therefore be wary of adopting such measures in isolation.

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