

A New Deal for Drivers



Unleashing the power of Britain's greatest infrastructure resource

By Ben Southwood

Foreword by Julian Glover OBE



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About the Author

Ben Southwood is a Senior Fellow at Policy Exchange. Before he joined Policy Exchange he was a management consultant at KPMG, an economics correspondent for City A.M., and for five years Head of Research and Head of Policy at the Adam Smith Institute. He has written for academic journals, every major newspaper and magazine, and appeared on every major radio station and television news programme.

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Foreword

By Julian Glover OBE

A few years ago, I was enthusing to a reforming Prime Minister about the many merits of road pricing. It could cut carbon, I said excitedly. It might fix potholes, I added. It would save billions in wasted congestion, I explained. He looked at me with the look of someone who had come to learn the difference between policy and politics. “It’s a brilliant idea, of course. Everyone agrees. I certainly do. But it will never happen”.

As this Policy Exchange paper explains, the idea of charging to use roads is almost as old as our roads themselves. But, with the honourable exception of the first Mayor of London, no one has been brave enough to do it on a large scale.

That, I am sure, is going to change. There is a simple reason why. My current car is a plug-in hybrid. My next car will be pure electric. Neither pay VED to use the roads. Even the hybrid saves me a huge amount in petrol tax. Apart from insurance, and servicing, and the cost of hammering our bumps and dents caused by narrow Derbyshire lanes, using the car is effectively free.

The most powerful force in British government, HM Treasury, can’t tolerate that for ever. Losing revenue as more cars go electric, while picking up all the costs of our road network, isn’t just fiscally foolish. It is also a route to a transport system that’s starved of cash, as we can already see happening in the run-down nature of much of our local and major road network.

That’s why this contribution to the debate is so timely, just as the 2017 Wolfson Economic Prize, into paying for better roads, which I helped run, did its bit to encourage ambition and new thinking inside government.

This report addresses a quartet of issues. First, can a scheme sustain government revenue? Second, will it support not deter decarbonisation? Third, will it have a positive impact on congestion? Fourth, might it be politically tolerable or even popular?

It seems to be a tradition that discussion of road pricing leaps immediately from big ideals to micro-details. I’ll try to resist adding my own to the ideas set out so briskly in this report. I would want revenue to be used, in the main, to brush up the dreadful standard of the road network we already have rather than build more in a countryside already under pressure. There is definitely more for future policy makers to determine on the role data and digital systems can play in how we use and fund our roads: rather than scrap the idea of smart motorways, as is politically fashionable, we should make them genuinely intelligent pieces of infrastructure.

But none of these points take away from the central argument set out so obviously in what follows: that we can pay for our roads in a more sensible and effective way and one day we will. Once we get there, we will wonder why we waited so long to change. In a year or two, political advisers will be at work on General Election manifestos. A better way to pay for better roads should be at the top of the list.

Julian Glover OBE is a journalist and author who is Associate Editor of the London Evening Standard. He previously served as a special adviser in the UK Department for Transport and as chief speechwriter to the former Prime Minister David Cameron.

Executive Summary

- Britain's motorists are getting a bad deal. Every year they pay £40bn in fuel duty and road tax, to face potholes, traffic jams, and seemingly endless roadworks. Only a small fraction of what motorists pay goes towards building new roads, even though most drivers believe they are sorely needed.
- There is an alternative to the status quo that can deliver faster road speeds for drivers which could be used to both improve Britain's roads and add to the network: road pricing. However, prior defeats show that it will only work if the scheme is genuinely designed to benefit the British motorist: both revenue neutral and using its funds on projects they endorse, while of course also benefiting other members of society.
- Average road speeds, especially around cities, are painfully low, with peak time speeds often dropping below 10mph, adding as much as half an hour or an hour to journey times in and around cities like Birmingham.
- Traffic, as well as being irritating, has serious economic costs. Long and variable journey times mean cities lose out on the 'agglomeration' benefits that happen when people live near to one another.
- Traffic also means that people are forced to live near the city centre, in smaller homes than they'd like, without gardens, and makes them dependent on public transport. In areas where public transport alternatives are scarce, traffic means that people have to endure long commutes or miss out on the best jobs.
- Economic theory suggests that the motorists who cause the greatest costs in terms of congestion, pollution, and damage to the road should pay the most, and everyone else should pay less. Under this approach, drivers in rural and areas in need of levelling up, outside major cities, at off peak times, or of lighter vehicles should pay less; large companies like Amazon and Uber, with fleets of vans and cars in congested city centres, should pay more.
- Drivers rightly feel hard done by when governments propose schemes to impose yet further taxes on them without showing the clear benefits that will result.
- Both polling and evidence from around the world show that drivers can support improvements to the systems by which they pay for the roads, but only when these schemes do not treat their welfare as an afterthought.

- Successful road pricing experiments around the world show that it does not need to force drivers to shift to public transport or to cycle, but mostly leads to journeys being more evenly spread around the day-aka load balancing. Those who can work from home or work flexible hours tend to shift their driving time.
- In the age of working from home, Zoom, and flexible hours, it is clear how workers may adapt and adjust so they can save money under road pricing.
- Road pricing would help us see where investment in the road network is most needed, and then help us make those investments without requiring extra taxation-purely based on the funds that the new road would generate.

There are six key principles that should underpin road pricing in the UK.

If road pricing is to win popular support, it must be clearly designed around and sold on the following six principles:

1. No net additional costs to drivers on average i.e., revenue neutral compared to current total fuel duty and Vehicle Excise Duty;
2. Most drivers should pay less under road pricing than they paid in fuel duty and road tax; in particular rural drivers and those in 'left behind' areas must pay less;
3. The scheme must not rely on a shift to public transport or other transport modes;
4. Nearly all drivers will be better off overall given the benefits of free traffic flow-all or nearly all drivers will experience faster roads;
5. Improved safety of modern cars means that the Government should commission a study to assess whether speed limits on motorways can be safely raised to 80 mph;
6. More of the budget should be shifted towards road improvements, road building, and infrastructure such as bridges and tunnels.

There are three broad options for the implementation of a road pricing system.

1. National implementation, after the technology is proven.
2. Regional implementation, with some devolution to councils and city governments.
3. Implementation by vehicle type. This would steadily implement the scheme over stages, starting with lorries and delivery vehicles, and moving last to private cars.

Overall, a vehicle type roll-out has attractive features if it can be made politically credible but could have significant costs without substantial benefits if political considerations mean adoption is halted halfway. The other implementation options, by their nature, suffer less from this problem.

There are four important features that vary between cars that determine the ideal road pricing scheme.

1. **Axle weight and road damage.** Heavier vehicles cause more damage to roads, so should pay more.
2. **Local air and noise pollution.** A noisier car whose exhaust pumps out more particulates and carbon monoxide would pay more than a quieter electric car.
3. **Carbon charge.** The carbon charge would be zero for Zero Emissions Vehicles and high for inefficient polluting vehicles.
4. **Dynamic congestion charge.** The congestion price for rural roads might be zero much of the time, and even might be close to zero in the city at night. By contrast, driving in urban areas at peak time would be expensive.

The economically ideal system will track these precisely in line with their externality costs; a practical political solution may involve some imperfections relative to the ideal system but should still be guided by these four categories.

Modern technology makes road pricing cheaper and easier than ever before.

Users can use a location tracker for 'pay as you drive' or check and confirm prices on an app on their phone before they start their journey. This would be backed up by Automatic Number Plate Recognition (ANPR), as is currently done with Vehicle Excise Duty and insurance. This would make sure some drivers do not free ride on the financial contributions of others.

1. Introduction: The importance of Britain's roads

Britain is a nation of motorists. In every region of the UK barring London, the average household owns more than one car. We use cars, vans, and taxis for 84% of all passenger kilometres driven each year in the country.¹ The average person uses a car for 580 trips each year, walks for 250, and takes the bus for 50. We rely on roads to get to work, see our friends and family, go on holiday, and get to the shops. People use their cars because of their convenience and flexibility, and they are enormously popular among wide swathes of the British population.

The road network's enormous predominance in our transport means that it is our most important infrastructure resource, and something that must be managed carefully, to get the most out of it. But in recent years road building budgets have been thin, and revenues raised from drivers have been diverted to fund non-road priorities of all kinds.

This paper investigates whether we could get more out of our roads with a new deal for drivers that would tax drivers not on their fuel or annual registration, which is relatively flat, but in line mostly with whether they use the busiest roads at the busiest times. Doing so will only work if it is designed to benefit drivers. That means it must be fiscally neutral, and the funds must be used mostly to fill in potholes, expand the road network, and keep roads safe.

If we can design such a scheme, and see it implemented effectively, we can all enjoy speedier roads, faster commutes, much less traffic, and better-connected towns and cities. The history of Britain's long tradition of charging for use of roads illustrates how a sensitive return of that tradition could help motorists and everyone else.

Turnpike trusts and the first wave of road improvement

A nation runs on its roads and tracks. Most school children can tell you that Romans built their roads straight. They might also be able to tell you that all roads lead to Rome. In Britain, much of the road network we currently drive around was first laid down hundreds or thousands of years ago.

According to GM Trevelyan, new hard roads were not built until the turnpike movement, and therefore these Roman roads steadily declined for a thousand years. This meant that, remarkably enough, the quality of English roads was better in the time of Alfred the Great than under Charles I. "In some parts of Kent and Sussex none but the strongest horses could, in winter, get through the bog", Thomas Babington Macaulay writes about the state of the English

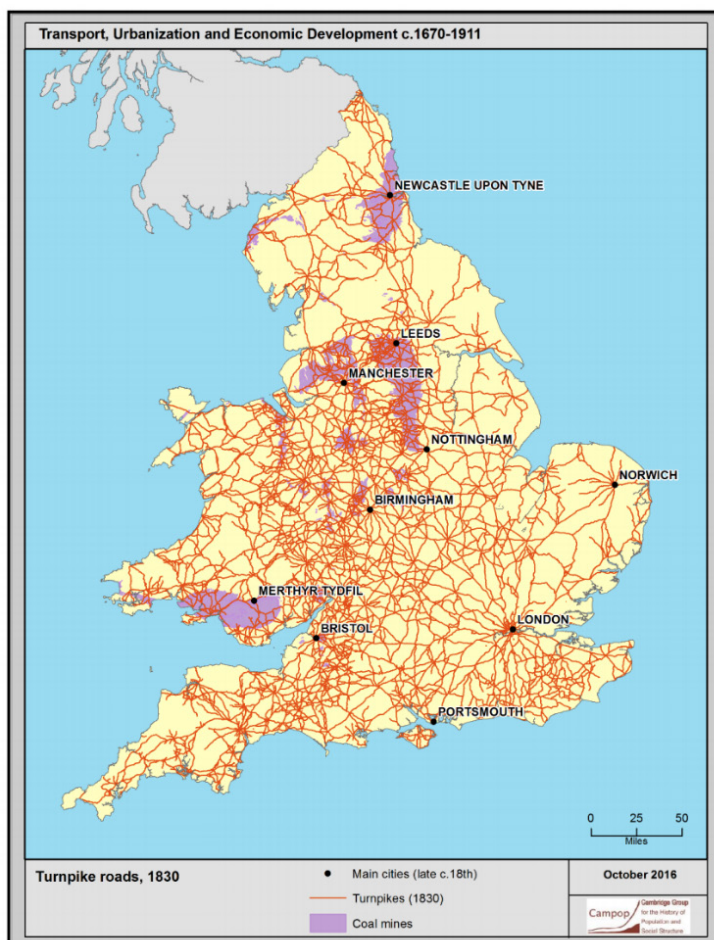
1. Department for Transport. (2020) *Transport Statistics Great Britain 2020*. [Link](#).

roads in 1685. The lack of a reliable road network led to fruit rotting in some town markets, while at the same time being scarce in towns only a few miles away.²

Until the nineteenth century, upgrades were not centrally directed. From the 1660s onwards, roads, which were poorly maintained and riven with highwaymen, began to be taken into private hands, paralleling the 'enclosures' occurring in agriculture. These were individually established by their own particular Acts of Parliament, and they were called 'turnpike trusts'. These trusts would collect tolls which were used to improve, maintain, or police the roads, and as well as taking over existing roads falling into disrepair, they were also established to create new roads.

The story of railway mania, in which Britain built some half of its current railway network in less than a decade in the 1840s, is well known. But turnpike mania, and the parallel canal mania, are much less famous, though no less important for Britain's early and remarkable industrialisation. By 1752, the peak of turnpike mania, turnpike trusts covered 11,000 miles of British road. By 1836, when the final 942nd Act of Parliament authorising a new trust was passed, they covered some 22,000.³

Figure 1: Map of turnpike roads and major cities in 1770.



Source: Bogart, D. (2017).⁴

2. Macaulay, T. B. (1848) *The History of England, from the Accession of James II*, Vol. 1 (Philadelphia, US: Porter & Coats).
3. UK Parliament. *Turnpike and tolls*. [Link](#).
4. Bogart, D. (2017). 'The Turnpike Road of England and Wales', *The Online Historical Atlas of Transport, Urbanisation and Economic Development in England and Wales c.1680-1911*, p.13

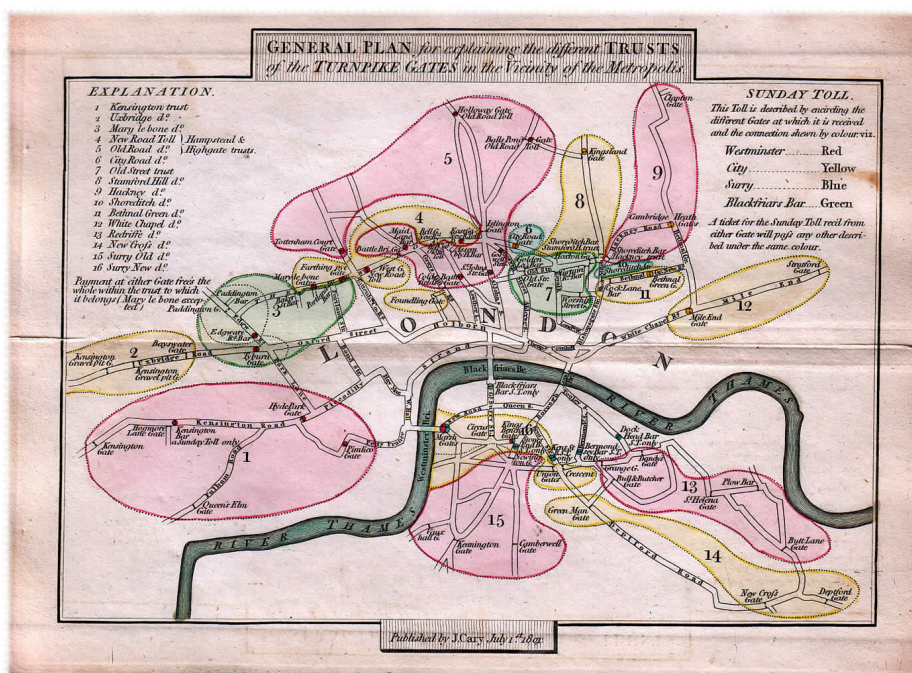
They covered roads in and out of every major city, with particular clusters around successful cities such as Bristol, in these cases specifically built to connect the city with its hinterland, like the turnpikes into London.

These private trusts were non-profit and funded their improvement activities with bonds mortgaged against their future toll revenues, which they operated thousands of toll booths to collect. They arose because increasing population, population density, wealth, and economic activity meant that the roads, heretofore kept up by small tolls levied by parishes, were steadily degrading. This problem was especially acute in the Southeast where larger and larger vehicles were being used to bring food into London, whose population grew from around 350,000 in the 1660s to 1 million in 1800.

Roads were very substantially improved. Whereas the trip from London to Manchester took around 90 hours in 1700, faster coaches on better kept-up roads meant that by 1774 it took just 24.⁵ Average speeds improved from 2.6mph to 6.2mph between 1750 and 1800.⁶ By the 1830s average speeds were closer to 8mph and some coaches could do 10mph. These huge productivity improvements also applied to goods: the cost to transport a given amount of freight roughly halved during the Georgian era.⁷

Britain was getting closer to itself, allowing more of the benefits from economic agglomeration. This may have been essential to getting the Industrial Revolution going, well before the railways set in in any serious way.

Figure 2: General Plan for explaining the different trusts of the Turnpike Gates in the Vicinity of the Metropolis.



Source: John Cary cartography dated 1st July 1801.

5. Bogart, D. (2017) 'The Turnpike Roads of England and Wales' in *The Online Historical Atlas of Transport, Urbanization and Economic Development in England and Wales c.1680-1911*. [Link](#).

6. *ibid*: p.27.

7. Gerhold, D. (1996) 'Productivity change in road transport before and after turnpiking, 1690-1840', *The Economic History Review*, 49(3), pp.491-515.

Roads since the turnpikes

From 1815 onwards there was a major turnaround that would perhaps have surprised the Georgians. The state began to slowly take an interest in the generally private, non-profit, or municipal interests that ran the roads. Perhaps the first state-funded road building or improvement project since Roman times was Thomas Telford's upgrading of the Holyhead Road, which begins with Marble Arch in London and ends at Admiralty Arch in Holyhead, Northwest Wales, and is now the A5. This was the beginning of a slow shift to government control and direction.

By the 1910s and 1920s, municipal, local, and central government took the lead in almost all road infrastructure projects. To take an example, the Portsmouth Road runs between Southwest London and Portsmouth, via Kingston and Guildford, and has done so for centuries. It was improved steadily through the 1920s, with a Kingston bypass added to reduce traffic in the town centre. It became the A3, and the improvements were contracted for collaboratively by the Ministry of Transport and London County Council.

The situation now

If the 20th century was dominated by the rise of the motorcar, the spread-out suburb, and the motorway, the 21st century has been, in part, a return to traditional urbanism. Planners, politicians, and urbanists are more likely to praise Jane Jacobs than Le Corbusier or Robert Moses. Planners, councils, and developers are united by an interest in sustainable design and 'green' methods and practices. Across the world, there is a push for more walkable urbanism, like the tightly knit urban fabrics of our traditional cities.

Behind this trend is, in part, a recognition that many of our roads are full at peak times.

Birmingham, England's second city, suffers from perhaps the most extreme peak road demand in the UK. At peak times, traffic on key roads increases massively, halving the number of people who can get to the city centre within 30 mins.⁸ Leeds faces similar problems. It is also the largest city in Europe without a metro system, since its 20-route tram network was closed down by the city council in 1959.

Famously, London's road speeds have been more or less flat for almost a hundred years. RJ Smeed predicted in 1949 that speeds would never rise much above 9mph: anything above that would encourage more driving, thereby leading to more congestion, until drivers were no longer willing to tolerate the congestion⁹. Anything below that would induce driving at different times, use of public transport, walking, cycling, or fewer journeys, until the roads once again flowed at 9mph again. Smeed's words proved prophetic: the average speed in London was indeed around 9mph for most of the last 70 years.

In general, British journeys at peak times, principally during the school run and commutes to work, face enormous congestion, leading to slow and unpredictable journeys. The grinding unpleasantness of traffic lies not

8. Productivity Insights Network. *Real Journey Time, Real City Size, and the disappearing productivity puzzle*. [Link](#).

9. Smeed, R. J. (1949). Some Statistical Aspects of Road Safety Research. *Journal of the Royal Statistical Society. Series A (General)*, 112(1), pp.1-34. [Link](#).

just in the unexpected delays it adds to trips, but also in the general human psychological dislike of being stuck in it.

In cities across the world, from Bangkok to Bolton, traffic congestion is seen as a fact of life. Places that have avoided it have done so only through poverty, low population density, or by banning vehicles from areas entirely. Poverty means people cannot afford cars at all; low population density means that there are never enough people travelling at any one time to fill the available roads. Neither is an option for England. Banning cars from areas altogether is possible, but often comes at a high cost to the mobility of residents, especially those who are older or disabled.

Residents in many places in developed countries oppose new development nearby mainly due to the fear that more new homes will bring an influx of traffic to local streets, meaning a loss of amenity for them and other existing residents. These rational fears about increased congestion are a key driver of opposition to development, or what is called 'NIMBYism'. In some cases, this has meant entire settlements of low-density suburban development going on for miles in every direction with no denser central area.

For example, Lubbock in Texas, a city of over 250,000, has no high street, main street, or central business district. There is scarcely a single instance of walkable urbanism across the entire area. Yet Lubbock is not a satellite to a larger city: the nearest major city is over 100 miles away. Here, if anywhere, there are prospects to intensify the existing urban fabric. Yet the city prohibits this from happening, and continues to add new housing on its periphery, largely because of such concerns, combined with an abundance of low value land to expand into.

High streets are valued more highly in the UK, which has almost no examples of towns without a definable centre where people can meet, shop, drink, and eat. But the residents of twentieth-century British suburbs often defend them against the construction of new homes in a way that is not so different to their American peers. Part of their reason for this is that maintaining low population densities is perceived to be the only way they can ensure that their streets remain uncongested, so that they can get around easily and freely. Of course, in some respects this can have negative consequences, as without sufficient nearby population density these prized high streets can become unviable, and wither away.

This is also why 'car free' developments have become popular. In these developments, residents are prevented from ever obtaining a parking permit from their local authority, so as to reduce existing residents' fears that their development will raise congestion in the local area.

There are only a tiny number of counterexamples-cities that are dense and affluent, but without severe traffic congestion. What unites them is that instead of charging people largely for their fuel, or through a road tax, their driving taxes fall on those who use the scarcest roads at the busiest times. Typically, they also have parking that is controlled by locals, or charged out at the market price, rather than subsidised or required by regulation.

One example is Singapore. Singapore's population density is about double Birmingham's and around one and a half times London's. The average income is much higher than either. And yet, cars speed along at over 18mph on average at peak times right through the city. What's more, despite both rising population and income, Singaporean average speeds have been going up, both on motorways and arterials, over the past decade.¹⁰ This is because Singapore, instead of charging a flat rate to everyone for their fuel, charges people based mostly on how much demand there is for the roads they are using. Another example is Tokyo, where there is no free or local authority provided street parking, and major roads are mostly tolled.

In short, supply and demand works on the roads as it works on any other scarce good. Supply and demand, in most markets, are equalised by prices. When a market lacks prices, we must either ration the good, or we must queue for it. Queues work because they make driving so unappealing that they deter people from driving. But relying on them has large costs: they make driving unpleasant and inconvenient for everyone, as we describe in greater detail below.

This paper investigates whether Britain might be able to enjoy a similar situation to Singapore on its roads if it too could shift the burden away from all drivers, and towards those drivers using the scarcest roads and at the busiest times.

10. Ray, L. (2015) 'SG: Average speeds highest in a decade', *One Shift*. [Link](#).

2. The economics of roads and road pricing

Driving taxes today: Fuel duty and Vehicle Excise Duty

In Britain, drivers are taxed mainly through fuel duty and Vehicle Excise Duty, known as road tax, which is a flat annual charge based on features the car has. Vehicle Exercise Duty raised around £6.5bn in 2019-20, with the average driver paying £175, though it was possible to pay nothing, or as much as £2,000, depending on how polluting the car was.¹¹ Nearly 40m cars attracted the tax. Fuel duty was expected by the Office for Budget Responsibility to raise £28.4bn in 2019-20 - plus a further 20% in VAT on the duty.¹² In total, therefore, drivers pay around £40bn in taxes and duties purely levied on driving. This is about 5% of the total tax take, or roughly the same size as the defence budget.

Road tax, clearly, does not vary with how much the car is driven. Fuel duty does vary with how much a car is driven, but in a relatively crude way. For example, peak and off-peak driving costs the same, and outside of local charges and tolls, there is no link to any costs imposed on the air or noise of a busy area versus an empty one. Thus, the main constraint on whether a driver decides to drive at peak times is how many other drivers they expect to drive. As we discussed above, this results in very low speeds.

The current system of road tax and fuel duty is under pressure from the rise of electric vehicles (EVs). Today, EVs do not pay fuel duty (because they are “fuelled” with electricity rather than petrol/diesel). EVs are also currently exempt from road tax.¹³ Fuel duty and road tax currently raise £39bn per year. In a recently-published report, HM Treasury noted that the transition away from fossil fuels will lead to a “significant loss of tax revenue”, particularly from road vehicles.¹⁴

Road pricing: The alternative to fuel and vehicle taxes

Abolishing the current crude taxes on motorists and replacing them with a charge on using scarce roads at scarce times will have a ripple of important effects. As with any policy change, there will be some costs. But these will be outweighed by a huge array of benefits. A huge literature of other work, including by Policy Exchange, has spelled out the detail of these economic benefits.¹⁵

Until recently, charging flexible and varying road taxes was difficult and expensive. A UK-wide scheme may have required thousands of gantries or

11. Office for Budget Responsibility. *Vehicle Excise Duty*. [Link](#).

12. Office for Budget Responsibility. *Fuel Duties*. [Link](#).

13. HM Revenue & Customers (March 2020). *Vehicle Excise Duty rates for zero-emission vehicles*. [Link](#)

14. HM Treasury (October 2021). *Net Zero Review: Final Report*. [Link](#)

15. For an introduction see: Stephen Glaister's Smeed Memorial Lecture, *The Acceptability of Road Pricing* by John Walker (for the RAC). [Link](#). And the finalists and winning entries to the 2017 Wolfson Economics Prize for an introduction

Automatic Number Plate Recognition (ANPR) cameras. New technologies have altered this situation, making possible what is sometimes called ‘next generation’ road pricing. Next generation road pricing would replace the £40bn raised by current road charges with £40bn levied based on driving’s spill-over costs.

The basic economics of roads and congestion are simple. The more traffic there is on a road, the slower it must flow. Beyond a certain number of vehicles, not only does the speed of each vehicle decline, but the number of vehicles that can traverse that road per hour also decreases. One’s decision to drive and use a road imposes what economists call a negative externality – a spill over cost – on any other user on the road. This externality rises very quickly as the number of drivers goes up beyond a certain point. When the road is far below capacity there may be almost no cost to you of someone else driving. When the road is nearly full, then small increases in traffic can make things much worse for everyone. When there is an accident and the road is full, the knock-on effects are enormous.

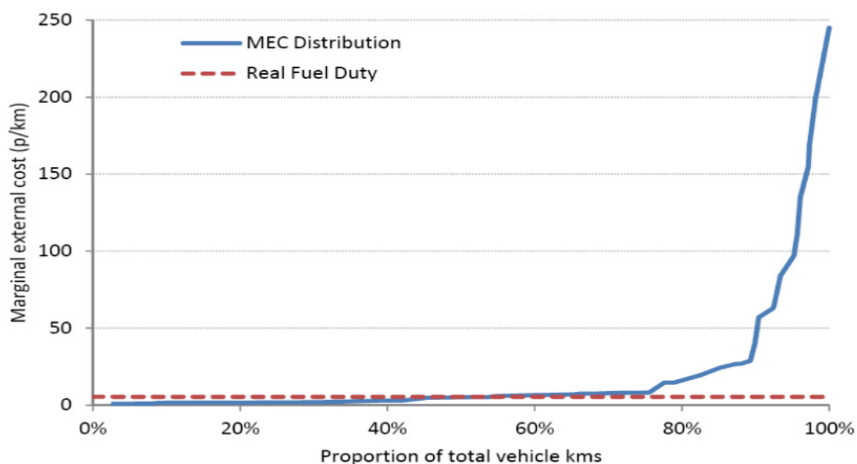
Another way of putting it is to imagine everyone travels by bus. Since buses take up much less extra road space than cars per person, then for a given number of people travelling a given number of trips, they can go quicker overall. But imagine you are one of the bus’s passengers and you have a car. It’s true that overall it’s quicker if everyone takes the bus. But because buses don’t take you all the way to your front door, and because they have to stop at stops along the way, it’s quicker for you to drive your car. Thus everyone, quite reasonably, decides to drive. But if everyone drives at the same time, the roads are gridlocked, and everyone ends up with longer travel times than they had when they all took the bus.

Two further features of the economics of road pricing are especially important. The first is the variety of possible schemes that can be imposed. The second and most important feature of a road pricing system is that it tackles the difference between busy and quiet roads, and therefore the difference between peak and off-peak times.

Figure 6 illustrates how at least 40% of British drivers are paying fuel duty that is too high, and another 35% about the right amount, while the remaining small fraction are paying far too little.¹⁶ These kilometres will be those that really make the transport system seize up - those driven at rush hour and on key routes around, through, or into/out of cities. This reflects the fact that most roads in the UK do not face serious congestion.

16. Glaister, S.M. (2014) ‘The Smeed Report at Fifty: will road pricing always be ten years away?’, UCL Smeed Memorial Lectures. [Link](#).

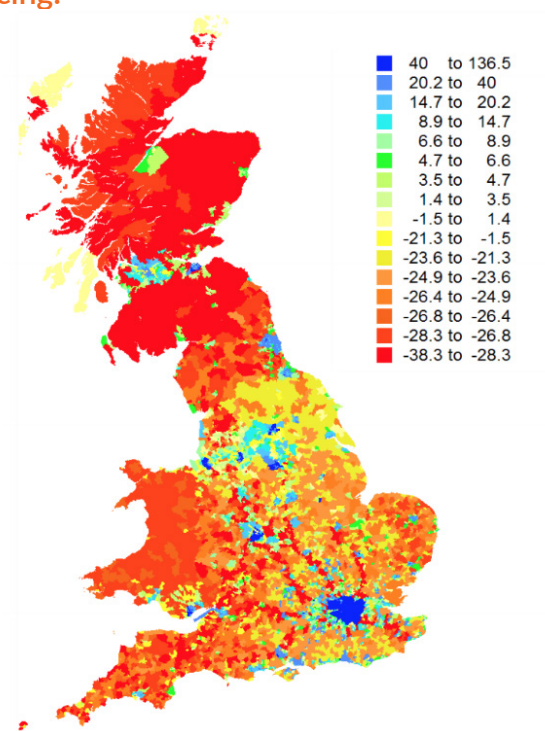
Figure 3: Distribution of the marginal external costs of motoring.



Source: Institute for Fiscal Studies.¹⁷

The map below shows how most of the country, including rural and left behind areas, would pay less under a more efficient scheme that raised no more in total than fuel duty and road tax raise today.

Figure 4: Changes in cost per vehicle under revenue neutral efficient pricing.



Source: Glaister, S., & Graham, D. J. (2006).¹⁸

17. Institute for Fiscal Studies. (2012) *The Road Ahead for Motoring Taxes?* [Link](#).

18. Glaister, S., & Graham, D. J. (2006). Proper Pricing for Transport Infrastructure and the Case of Urban Road Congestion, *Urban Studies*, 43(8), pp.1395–1418.

3. How road pricing can succeed and benefit drivers

There have been several successful and several abortive attempts to institute road pricing or similar systems in the UK and around the world. Most notably there was the successful attempt to first introduce then increase the Congestion Charge in London. What has united the failed schemes, as we will see, is two key things. First, they were intended to raise money from motorists, rather than exchange one kind of levy for another. Second, they largely delivered their benefits in a dispersed way to people who do not see themselves as necessarily benefiting and imposed their costs in a concentrated way on a self-conscious and motivated group. In a sense, these two key things are so closely linked together as to almost be the same thing. We will equally see how the small number of successful schemes have got around this problem and suggest how this might work in Britain today.

Road user charging in the UK

The Smeed Report of 1964 is the foundational document for road pricing in the UK. In Britain's post-war affluent society, cars got faster but roads got slower. Statistician RJ Smeed's study found what most studies have found since: congestion causes large costs for individuals and society, and it could be reduced substantially with a dynamic road user charge, that is higher in peak times and lower in off-peak times. He also discovered that London road speeds had averaged 9mph for decades, and predicted they would continue to do so. This remained true for fifty years-until the imposition of the Congestion Charge raised them to 11mph.

This report, though it promised benefits worth £100-150m in reduced travel times, or about 1.5% of the 1964 economy, was shelved almost immediately. According to a 1997 speech by PB Goodwin, a civil servant in the Department for Transport once found a note in Sir Alec Douglas-Home's handwriting which read 'let us take a vow that if we are re-elected we will never again set up a study like this one.'¹⁹ Smeed was not made Director of the Road Research Laboratory (which later became the Transport Research Laboratory) and focused on his career as an academic.

In the 1990s, a new wave of British transport economics, learning from the mistakes of the past, headed up a range of new committees and investigations that looked into road pricing once again. Their view, as expressed by Goodwin, was that any efficient scheme should be able to find support, provided that a clear account was given of how the money

19. Goodwin, P. (1997) 'Solving Congestion (when we must not build road, increase spending, lose votes, damage the economy or harm the environment, will never find equilibrium)'; ESRC Transport Studies Unit. [Link](#).

it generated would be used—in their view most obviously on improving public transport.

However, excepting the small Durham congestion charging scheme, and the effective London congestion charge, none of this wave of road pricing policies came to fruition. Every time a scheme was proposed, notwithstanding how the revenues were proposed to be used, it was defeated by huge public opposition. In some cases, this was expressed through petitions involving millions of signatures; in others this came through a vote. This was true of Alistair Darling's 2004 Road Pricing Feasibility Study, the 2006 Eddington Transport Study, and the 2013 Strategic Roads Policy Review.²⁰

After the Government made it possible for cities to impose congestion charges on themselves, many cities held referendums to allow their citizens to decide whether one should be imposed. These were all rejected: Edinburgh's referendum saw 75% voting against and Manchester's 70%.²¹ Despite all of these rejections, road pricing always re-emerges as a policy option due to the overwhelming economic consensus in its favour, combined with the inability of any other roads policy to keep up with demand. A panel of 50 leading European economists were asked whether a congestion charge rebated through lower taxes would leave the average citizen better off. 84% of economists said they agreed or strongly agreed, and none disagreed. Comparable surveys in the US and Australia have found similar consensus.²²

When roads are unpriced, even the most ambitious schemes have not been able to build as fast as traffic grows, at least in densely populated areas. The 1989 Roads for Prosperity scheme, which was the most ambitious in recent British history, was an example of this inability to keep up with demand. Similarly, recent expansions of London's orbital bypass, the M25, have tended not to reduce traffic.²³ This is because although building road capacity allows space for more journeys, it also encourages more driving and more car ownership. In low density areas, enough roads can be built that driving never catches up, but above a certain population density there simply isn't enough space for the roads that would require.

The main counterexample to this pattern of failure is London. The London scheme, imposed in 2003, has generally been popular, and has now lasted eighteen years and two changes of mayor, including a change of parties. Not all of it has survived: the 2007 imposition of the Western Extension Zone (WEZ), roughly doubling the size of the charging area, was revoked in 2011. But broadly, it has not only sustained, but also seen several significant price increases, an extension to evenings and weekends, and a copycat in the Ultra-Low Emission Zone (ULEZ), an additional congestion charge that applies only to higher emissions vehicles. A huge expansion of the ULEZ was implemented in autumn 2021 covering the whole of Inner London.²⁴ We discuss below why the congestion charge sustained where other UK attempts did not.

Of course, there are also toll roads, the simplest and most ancient forms of road user charging. In general, across the world, and certainly

20. Glaister, S.M. (2014) 'The Smeed Report at Fifty: will road pricing always be ten years away?', *UCL Smeed Memorial Lectures*. [Link](#).

21. Ottewell, D. (2013) 'C-charge: A resounding 'No', *Manchester Evening News*. [Link](#).

22. See Davis, W. & Martin, L. (2018) 'Congestion Pricing – November 2018', *The Economic Society of Australia*. [Link](#); Chicago Booth. (2012) 'Congestion Pricing'. [Link](#); Chicago Booth. (2016) 'Congestion Pricing - 2'. [Link](#).

23. Highways England. (2017) 'SM-ALR Monitoring, M25 J23-27 Second Year Evaluation Report'. [Link](#).

24. Mayor of London. (2021) *ULEZ Expansion*. [Link](#).

in Britain, these have been used only to fund new roads, bridges, and tunnels such as the M6, the Severn Bridge and the Dartford Crossing/Tunnel. Political opposition towards imposing tolls on existing, already-paid-for infrastructure has been intense.

Overall, in the UK there has been only isolated and minor success in imposing charges on drivers based on when and where they want to drive. In each case, success has come only when the system has benefited those most affected: drivers. Toll roads, bridges, and tunnels are possible when they help create new infrastructure; congestion charges have only worked in central London, where only a minority drive. As we will see, this tendency exists in not just Britain, but around the world.

Toll roads in Europe

In European countries 'user pays' pricing approaches, where individual motorists pay for motorway access in proportion to their use, are the norm. In addition to fuel excise duties, which can be seen as an approximation of 'road usage', 15 out of the 27 EU member states have some national motorway charging scheme for passenger vehicles. Of these, 7 are time-based schemes where motorists pay for 'vignettes', car stickers, giving them motorway access for a predetermined period of time. The remaining 8 are toll road systems where motorists are charged based on the distance of motorway they 'consume'.²⁵

Tolled motorways are particularly in use in southern Europe, with Spain, Portugal, Italy, and Greece all using it as the road charging mechanism of choice. But in no other European country is toll revenue as important as in France. 75% of France's 10,800 kilometres of motorway are tolled.²⁶ In 2016, France raised €8.98 billion from tolls, more than any other country. And 19% of tax revenue raised from road and transport charges in France came from tolls, second in Europe after Switzerland.²⁷

The history of French tolled motorways is a familiar one: car ownership rose during the *trente glorieuses*, the post-World War II economic boom, and the government wanted to increase investment in motorways. Stretches of motorways construction and management were put to a competitive tender, with the winner being allowed to get a return on their investment through toll charges. Between 1960 and 1980, the length of France's motorway network grew some 2,800%, of which three quarters were tolled.²⁸

Congestion charging in Stockholm, Gothenburg, Milan, and Valletta

Stockholm introduced a congestion charge in 2007, after a trial period during 2006. Like the Milan and Singapore schemes, its main element was an entry and exit charge. The charge was and remains relatively low: the maximum entry and exit fee is 35 SEK, or around £3.²⁹ This fee only applies for the busiest two and a half hours of the day – 7.30am to 8.30am and 4pm to 5.30pm. Before 6.30am and after 6.30pm the fee is zero. This means that drivers need not incur any charge at all unless they wish to travel at the busiest peak time. Like the London system it is implemented

25. Figure 30, p.52. Source: European Commission. (2019) *Transport taxes and charges in Europe: An overview study of economic internalisation measure applied in Europe*. [Link](#).

26. Fayard, A. (2005) 'Analysis of highway concession in Europe', in Ragazzi, G. & Rothengatter, W. (eds) *Procurement and financing of motorways in Europe*, Vol.15 (Amsterdam, NL: Elsevier)

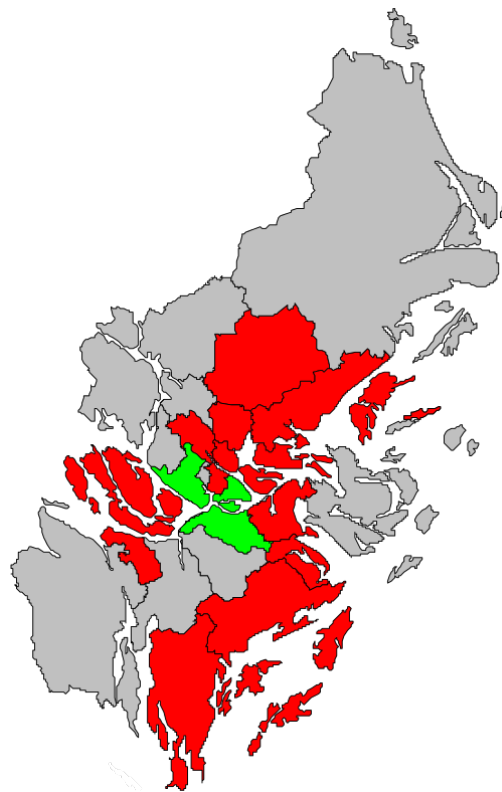
27. Table 9, p.69. Source: European Commission. (2019) *Transport taxes and charges in Europe: An overview study of economic internalisation measure applied in Europe*. [Link](#).

28. Fayard, A., Meunier, D. & Quinet, E. (2012) 'Motorway Provision and Management in France: Analyses and Policy Issues', *Networks and Spatial Economic*, 12(2), pp.299-319.

29. Swedish Transport Administration. On 1st January 2016, congestion taxes in Stockholm will be raised and congestion tax will be levied on Essingeleden. [Link](#).

through (ANPR) cameras, but unlike the London system of daily bills are sent to those entering and exiting the centre at the end of the month. The charge successfully reduced traffic and thereby air pollution and its effects (such as asthma attacks in children).³⁰

Figure 3: Map show the results of the referendum in each city of Stockholm municipality.



Source: Data drawn from Stockholm Stad.³¹

As the trial finished, a centre right coalition took over from the previous left-green coalition. They had opposed the congestion charge during the general election campaign. However, when congestion charging won a majority in a plebiscite, the centre right committed to implementing the scheme permanently, with one change: they earmarked the revenues for new road construction rather than for public transport infrastructure. Polling since then has suggested that a larger majority has grown to approve of it.³² Notably, voters in the city itself were strongly in favour, whereas voters in the wider metropolitan area, in outlying villages and low-density suburbs voted against the measure. This presumably reflects the benefits and costs imposed: those living in the city centre receive more of the benefits of freer flowing traffic and less pollution within the centre, but less cost, since they drive in and out of the city less often.

Following on from the success of the Stockholm scheme, Gothenburg developed a scheme of its own with very similar features in terms of implementation, prices, and so on. This scheme, imposed in 2013, lost a plebiscite that year. However, since this referendum was only advisory

30. Simeonova, E., Currie, J., Nilsson, P., & Walker, R. (2019) 'Congestion pricing, air pollution, and children's health', *Journal of Human Resources*, 56(4), pp.971-996.

31. Data drawn from Stockholm Stad. [Link](#) & [Link](#).

32. Walker, John. (2011) 'The Acceptability of Road Pricing', RAC Foundation. [Link](#).

in legal terms, political elites decided to keep the Gothenburg congestion charge going, and it remains today.

Clearly it has not proven so unpopular that it has been completely unsustainable. But its relative unpopularity may be explicable through features that differed between the two systems. Firstly, its aim of raising money means it is not set to reduce congestion and may to some drivers represent a 'worst of both worlds' scenario where road speeds have not risen substantially, but charges have increased. This happened perhaps because of a related problem: Gothenburg's issues with congestion were not nearly as large as Stockholm's which had been a widely accepted problem since the 1970s, and where they existed, they were not concentrated primarily in the city centre.³³ Secondly, the charge zone includes many of the alternatives to driving through the city centre. Thirdly, Gothenburg has higher car ownership, lower population density, and significantly worse public transport. That said, it must be stressed that evidence suggests that public transport investment made almost no difference to the Stockholm implementation.³⁴

In 2008, Milan introduced a congestion charge for 8km² of the city (by comparison, London's is 21km²) called the Ecopass.³⁵ Like the London congestion charge, the level of the levy is set in part by the environmental standards of the vehicle in question. The maximum charge, which hit the most polluting vehicles, was €8 per day on implementation (worth about €10 today). There was no distinction between peak and off peak. Since then, the scheme has been reconstituted as Area C, with a simpler and lower schedule of charges for permitted vehicles, zero rates for zero emissions vehicles, and with the most pollution vehicles simply banned.³⁶

The initial system cut vehicle kilometres in the restricted zone by 14%.³⁷ The second scheme may have had an even larger effect.³⁸ Both schemes raised road speeds and bus speeds. And Area C has been kept on, despite suspension during Covid, and is broadly accepted politically.

Valletta, the densely populated capital city of the island country Malta, introduced a congestion charge in 2007, called Controlled Vehicular Access. This scheme replaced a previous simpler regime, the V-license, which was an annual road tax-like charge that drivers would pay in advance to gain access to the city centre. Compared to the London, Stockholm, Milan or Singaporean systems, the zone of control is extremely small: under one kilometre squared.

Valletta's old town, which is on the end of a narrow peninsula, now makes up only a small part of the large city that bears its name. It is still the commercial centre of the metropolis, with a daytime population of 50,000 but just 7,000 permanent residents.³⁹ At the onset of the policy Malta had one of the highest car ownership rates in Europe, and congestion delays per kilometre were three times the European average.⁴⁰ The CVA policy charged drivers coming into the central zone for every 30 mins they remained there, with cameras automatically tracking entry and exit based on the national vehicle registry. The maximum daily charge was €6, compared to €46 annually for the previous V-license system.

33. Hysing, E., & Isaksson, K. (2015) 'Building acceptance for congestion charges—the Swedish experiences compared', *Journal of Transport Geography*, 49, 52-60.

34. Walker, J. (2011)

35. Rotaris, L., Danielis, R., Marcucci, E., & Massiani, J. (2010) 'The urban road pricing scheme to curb pollution in Milan, Italy: Description, impacts and preliminary cost-benefit analysis assessment', *Transportation Research Part A: Policy and Practice*, 44(5), pp.359-375.

36. Cerchia Dei Bastioni Milano. [Link](#).

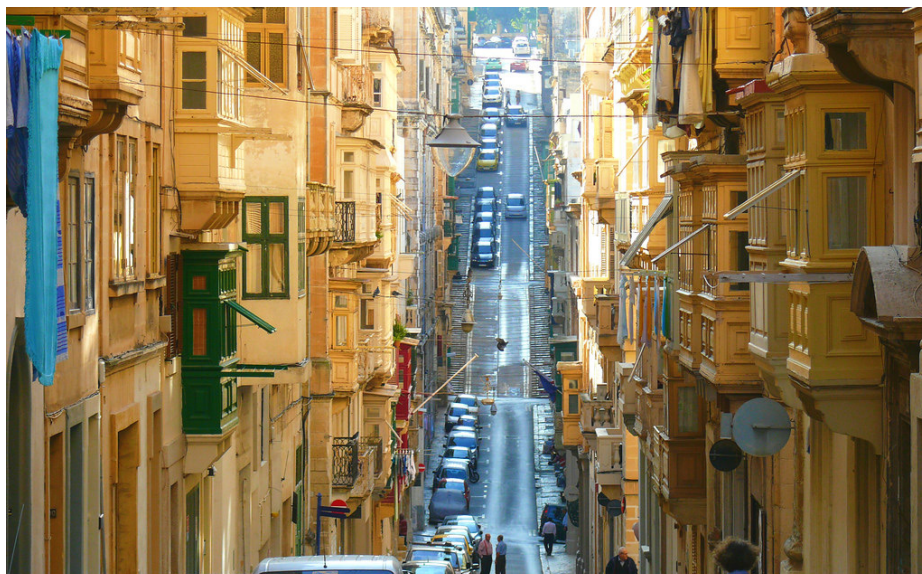
37. Rotaris, L., Danielis, R., Marcucci, E., & Massiani, J. (2010)

38. Milan Chronicle. (2012) *si paga anche con il Telepass*. [Link](#).

39. Ison, S.G. & Attard, M. (2013). 'The Smeed Report and road pricing: the case of Valletta, Malta', *Bank of Valletta Review*, 47, pp.1-23.

40. Eltis. (2015) *Valletta's pioneering congestion charge (Malta)*. [Link](#).

Figure 4: Old Mint Street, Valletta, Malta.



Source: Leslie Vella on Flickr.⁴¹

The system operates at 96-98.5% accuracy, with very few contestations. It has bedded in, with little controversy. However, various features of the scheme may make it less successful than alternatives:

Hong Kong and Singapore

Hong Kong and Singapore face distinctive transportation challenges due to their exceptionally high population densities. It is thus perhaps unsurprising that Singapore has the world's only full road pricing system. Interestingly, however, Hong Kong has not managed to implement such a system, despite many feasibility studies and consultations over past decades.⁴²

Hong Kong did implement a trial scheme in the 1980s. The system, which ran on trial between 1983 and 1985, fitted all cars with receivers that automatically added up charges based on the toll points they went over.⁴³ There were also cameras around the city to check that drivers were not tampering with these 'electronic number plates'. Despite the 1980s technology, the system achieved over 99% effectiveness i.e., it charged those people it intended to charge.⁴⁴

In the wake of the trial scheme, the Hong Kong Government proposed and analysed three schemes of varying complexity, mainly based around driving during peak hours. The available analyses found very high benefit-to-cost ratios e.g., Timothy Hau estimated one at around 14, driven primarily by reducing congestion, which meant freer flowing roads.⁴⁵

Yet despite the positive academic and economic analyses, the scheme failed with a wave of opposition and protests from drivers. Several reasons for this have been suggested. A first is that it coincided with a short run economic downturn; a second was that the scheme was perceived as unfair when many other levies on cars and lorries were being levied or raised,

41. Leslie Vella on Flickr. [Link](#).

42. Hong Kong Transport Department. *Spare Time? Yes! Electronic Road Pricing Pilot Scheme in Central*. [Link](#).

43. Hau, T.D. (1990) 'Electronic Road Pricing, Development in Hong Kong 1983-1989', *Journal of Transport Economics and Policy*, 24(2), pp.203-214.

44. Dawson, J.A. & Catling, I. (1986) 'Electronic road pricing in Hong Kong', *Transportation Research Part A: General*, 20(2), pp.129-134.

45. Hau, T.D. (1990).

while taxis were exempt. It was also introduced almost simultaneously with the signing of the Sino-British declaration and the confirmation that China would take over Hong Kong in 1997-this may have raised worries about privacy and overweening government. A fourth possible reason is that many doubted whether the government would, as they promised, return the road pricing revenue to motorists.

The Singaporean scheme evolved out of the earliest congestion charging scheme, which combined a park-and-ride system, with area licensing (a type of congestion charge) and increased parking fees.⁴⁶ When this was instituted in 1975, it already covered a substantial central Singapore zone with 31 entry and exit points, but it operated only at peak times, 7.30-9.30am on weekdays.⁴⁷ The zone was later extended further, the peak morning period was lengthened, and an evening period was added.

The system also came to cover a greater proportion of vehicle traffic. It was initially very limited, covering only private cars with fewer than three passengers-motorcycles, taxis, HGVs, and carpools were all exempted. Eventually taxis and goods vehicles-which Singaporeans had started using for private transport to dodge the tax-were included. Finally carpools, which were working as small buses, had their exemption removed.

The initial version of the scheme saw a 44% drop in peak-time traffic in the central zone, but without any shift to public transport. Drivers simply did their journeys at off-peak times and via alternative routes. By 1988, 13 years after imposition, peak time traffic was still down 31%, despite a massive increase in income, wealth, vehicle ownership, and so on. Over the intervening period to today, despite population and wealth increases, and falls in the prices of owning and operating cars, road speeds have continued to stay flat or increase.⁴⁸

In the early 1990s Singapore started considering an electronic scheme that would make implementation more efficient. They invited ten consortia to bid to run the system and conducted extensive tests with the three shortlisted parties.⁴⁹ The eventual system was based around smart cards and in vehicle devices that tracked travel. When these were shown to work (less than 0.5% of people received the wrong bill), the government paid to have all 680,000 eligible vehicles fitted with the receiver system.

Initially, the new system followed roughly the same rules as the previous one: the smart card was used to pay for entry into the CBD at peak times. Eventually the authorities began experimenting with varied prices, based around keeping traffic flowing at a target high speed - higher on expressways than on city streets.⁵⁰ This meant a higher than standard 'surge' price when traffic was high and a lower than standard discount price when the roads were empty - a sophisticated descendant of the crude peak/off-peak system.

The politics of road user charging

The successes and failures of British policy in this area illustrate how road user charging can and cannot be successful.

There are enormous benefits to be gained from ensuring that our roads

46. *ibid.*

47. Keong, C.K. (2002) 'Road Pricing Singapore's Experience', *Imprint-Europe*. [Link](#).

48. Land Transport Authority. (2021) *Road Traffic Conditions during Peak Hours*. [Link](#).

49. Christainsen, G.B. (2006) 'Road pricing in Singapore after 30 years', *Cato Journal*, 26(2), pp.71-88.

50. Keong, C.K. (2002)

are better adapted to let traffic move freely. But, as in many other spheres, those who fear they may lose from such reform often succeed in allying to block change. Happily, those enormous benefits mean that, with enough care, we can bring forth change that benefits nearly all drivers by ensuring that they share in those benefits, while helping others too. There is already plentiful research on how to solve the political challenge in such cases, which economists call ‘transitional gains traps’.⁵¹

It helps to think of things in terms of property rights. In general, humans have a cognitive feature called ‘the endowment effect’ by which they tend to value things more highly when they belong to them than when they belong to no one. Or, equivalently, they require a higher price to part with something of theirs than they would pay to get hold of that thing if they had never owned it. This general tendency is a part of why varying types of property right recognising and formalising this feeling of ownership have been common across almost all human societies. It is also a part of why societies which eventually embedded these into formal law have generally been more successful.

Creating such rights encourages investment. If people can simply take what you produce, you will not expend much effort on production—in fact, you may expend your effort mostly in trying to protect it. By contrast, if you are secure in your property and you do not need to spend effort protecting it, you will invest great effort into improving it.

All of these ideas are embedded firmly into economic reasoning, and into policymaking. But thinking often constrains the idea of property too narrowly, as only extending over physical items, land, and perhaps contracts, or certain codified ideas—intellectual property.

In fact, people have interests in a much wider range of things. If these things are not protected rights, they are willing to spend effort protecting them. This might mean campaigning that a local park is not built on. They may even do this if that effort merely balances out the effort of others working against them. Their existing interests in using the roads are one example of something people perceive themselves as having a strong property-like claim to. If it is taken away, they feel unjustly deprived.

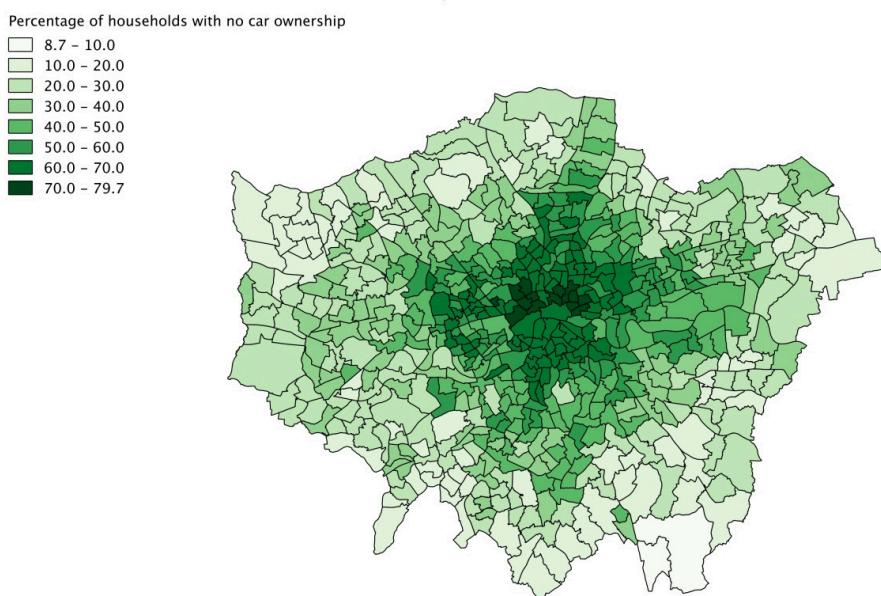
Most British people use a car for most of their journeys. British drivers pay considerable fuel duty on their petrol, along with a range of other levies such as vehicle excise duty: in total, these levies more than cover the costs of the road system. Indeed, some estimates suggest they cover the entire social cost of driving, other than congestion costs. Drivers tend to see road pricing schemes as a minor form of expropriation: being charged again for roads whose cost they already cover, and which they in a deep sense already own. However, if we are smart, we can make sure that the enormous benefits of road pricing are distributed so that they benefit motorists.

51. Trebilcock, M. (2015) *Dealing with Losers: The Political Economy of Policy Transitions*, (Oxford, UK: Oxford University Press).

Application to the UK

It is useful to see how this theory is reflected in the various successful and failed attempts to introduce forms of user pricing on UK roads that we discussed earlier. One example is, of course, the London congestion charge. One notable feature of the congestion charge is that Ken Livingstone, in the lead-up to introducing it, repeatedly stressed that the goal of the scheme was to reduce congestion. This was combined with a statutory hypothecation of the funds to London purposes.⁵² Since congestion in London in 2003 was already extreme, solving this was a plausible benefit to all those affected. When the charge in fact did increase speeds substantially, this balancing benefit to drivers may have been a key part of why it proved to be politically sustainable.

Figure 5: London wards and household vehicle ownership



Source: ONS Census Data (2011).⁵³

The congestion charge has some puzzling features. One is that the extension zone was revoked despite raising housing values within it. According to research from the Spatial Economics Research Centre, rolling out the Western Extension Zone substantially increased house prices in the affected area - by about 4%, or £30,000 on average.⁵⁴ This presumably reflected the reduced traffic, noise, air pollution, and so on suffered by homeowners there. But the scheme was revoked after 62% of respondents to a consultation backed removing it.⁵⁵ It's possible that negative respondents tended to be non-residents living outside the WEZ.

This said, the most recent mayoral election, in 2021, was won by the candidate associated with congestion charge extensions both in time, price, and the parallel congestion charge, the ULEZ. Sadiq Khan's platform also promised to consider a charge on driving into Greater London. This

52. Glaister, S. (2014).

53. ONS Census Data (2011). [Link](#).

54. Tong, C.K. (2016) 'Traffic Externalities and Housing Prices: Evidence from the London Congestion Charge', *SERC Discussion Paper No.205*. [Link](#).

55. Transport for London. (2010) *Mayor confirms removal of Congestion Charge Western Extension Zone by Christmas and introduction of CC Auto Pay in New Year*. [Link](#).

last charge would fall primarily on people who have no say over whether it is approved, potentially avoiding electoral blowback.

Clean air zones

Clean Air Zones are proposed for cities across the UK including Newcastle, Bath, Manchester, and Portsmouth. The first Clean Air Zone launched on June 1st in Birmingham. In Birmingham, heavy-polluting cars, taxis, and LGVs will pay £8 per day to drive inside the A450, which rings the centre of the town.⁵⁶ Buses, coaches, and HGVs will pay £50 per day. Vehicles going in and out of the zone will be identified by ANPR cameras and are required to pay within a thirteen-day period starting six days before the day in question and ending six days after.

Under the current rules this isn't the only way the charges could be imposed; for example, the Clean Air Zones can apply to only buses and coaches if so desired.

In political terms, they have some advantages and some disadvantages, compared to congestion charging or road pricing. On the plus side, they have been applied with a requirement to earmark the funds raised for local transport projects. If the authority spends these funds on roads projects, they may prove an acceptable quid pro quo for drivers, who will see a benefit as well as a cost. However, there is no requirement for this, and local authorities may decide to use the funds for public transport.

They also benefit locals by, in line with their intentions, improving the air quality they and their families experience. However, while this benefit will sustain even with the transition to zero emissions vehicles, any improvements for congestion or journey times will fall away over time. This means they may be a complement to road user charging reform, rather than a substitute.

The wave of clean air zones being approved is some evidence that locally designed policies with clear local aims can succeed politically. However, since most authorities that have proposed or established them have not yet faced elections, it is too early to tell whether they can sustain politically around the country.

Low traffic neighbourhoods

The recent roll-out of low traffic neighbourhoods (LTNs) provides more instructive examples in the political economy of roads and road usage. Of course, LTNs are slightly different to road pricing, in that they impose no charge to use most of the network but introduce certain 'modal filters'- which close roads to motor vehicles-and road closures in one or both directions. These closures, which can be seen as infinitely high tolls for certain sections of road, are tactically placed so that neighbourhoods cannot be 'rat run'-used as convenient through roads by commuter and other non-local traffic.

LTNs have arisen due in part to the steady increase in traffic London has seen over the past twenty years, combined with the introduction of GPS technology such as Google Maps. Maps technology means that anyone,

⁵⁶. #brumbreathes. *Birmingham's Clean Air Zone*.
[Link](#).

not just locals, can find routes through residential streets and around traffic. This has raised the total capacity of the network, but it has meant much more of the costs of driving—noise, pollution, and danger—imposed onto residential streets that had not expected it. Quiet streets became busy.

The imposition of LTNs has created a huge and energised response, largely made up of those who had previously relied on the ‘rat run’ routes now closed off. Facebook is full of groups such as ‘Hackney horrendous road closures’ in which users make the case against the LTNs that affect them. Their main complaint is that LTNs have increased traffic and journey times on the routes they used to use.

However, the communities directly affected by LTNs are generally in favour, albeit quietly. In the latest local elections, the vote for pro-LTN parties in all but one London ward with them went up and was essentially flat in the one exception.⁵⁷ These schemes are largely kept in place over time, despite imposing the unthinkable: an infinite road price on many drivers. This illustrates how changes to road rules can survive: they must create net benefits, and there must be a majority of those most affected that believe this is the case.

57. Bell, J. (2021) ‘The evidence is in: low-traffic neighbourhoods are popular’, *The Guardian*. [Link](#).

4. Policy recommendations

If road pricing is to win popular support, it must be clearly designed around and sold on the following principles:

- No net additional costs to drivers on average i.e., revenue neutral compared to current total fuel duty and Vehicle Excise Duty;
- Most drivers should pay less under road pricing than they paid in fuel duty and road tax; in particular rural drivers and those in 'left behind' areas must pay less;
- The scheme must not rely on a shift to public transport or other transport modes;
- Nearly all drivers will be better off overall given the benefits of free traffic flow—all or nearly all drivers will experience faster roads;
- Improved safety of modern cars means that the Government should commission a study to assess whether speed limits on motorways can be safely raised to 80 mph;
- More of the budget should be shifted towards road improvements, road building, and infrastructure such as bridges and tunnels.

It will be broadly possible to achieve these goals with each of three different broad programmes of implementation. This section will sketch out the contours of a road pricing system that could win political support from drivers and will then offer three means of making this system a reality in the UK.

Road pricing with political support: A new deal for drivers

As discussed above, road pricing schemes have regularly been considered, due to the enormous economic consensus in their favour, and their demonstrable ability to reduce traffic. However, they have generally failed as they have been advanced at least in part due to anti-driver and anti-motorist motives and have been designed to raise large amounts of revenue. Often this revenue has been directed towards projects that benefit non-drivers far more than the drivers picking up the tab.

Road pricing schemes have only been able to persist, and generate their large net benefits, when they have been designed with the insights of political economy kept in mind. That means making sure that drivers as a whole are significantly better off under the new system than beforehand. For example, in Stockholm the money raised by their congestion charge

was earmarked for road improvements. In Singapore, a key benefit is the rapid speeds drivers can enjoy at all times on all types of roads.

In the UK today, there are a range of principles that are crucial to make a road pricing scheme workable and politically achievable, so that it actually benefits the Government that implements it electorally and has a political consensus that sustains it over time. Because of the widely accepted and large economic benefits schemes such as this generate, this is more than possible, but only if policymakers are willing to see it as something other than a stick to beat motorists.

1. The scheme must not raise more than fuel duty and Vehicle Excise Duty currently do taken together

Drivers already pay around £40bn every year in the two main levies, or around £1,250 per car per year. This more than covers the roads budget of around £7.5bn and standard estimates of the size of the externalities.⁵⁸ Drivers are therefore reasonably sceptical about whether the existing burdens they face are justified and would be especially sceptical if these burdens were significantly increased. This means that a road pricing scheme must be capped at the size of the current set of motoring taxes, and both of these should be completely abolished.

2. The scheme must be structured so a majority of drivers are expected to pay the same or lower amounts under the new system

Transitioning to new systems is invariably difficult. Business rates revaluations cause great controversy each time they are attempted, even when they are fiscally neutral, as in our point (1). It has generally been easier for business rates revaluations to go through when nearly every business that has been affected, in a simple static analysis, has been a net beneficiary of the change. As seen in chapter two, this is not just possible, but a very likely outcome of any sensible road pricing scheme: a tiny minority of trips cause gigantic congestion costs, whereas nearly all normal drives have limited or negligible impact.

If it were merely a zero-sum redistribution from the small number of 'losers' to a larger number of 'winners', the scheme would still likely be politically unviable. However, as spelt out below, there are two large gains (with a plethora of impacts) that flow from road pricing but not from business rates. In short: road pricing leads to free-flowing roads and much faster travel speeds, and road pricing creates a pool of money with which to improve roads.

Road pricing has an extra benefit given the Government's priorities around regional inequality and national 'rebalancing' or 'levelling up'. Available analyses of the regional effects of road pricing suggest that rural and so-called left-behind towns are those most likely to pay less.

58. RAC. (2020) *Slash fuel tax or actually spend it on roads? RAC research reveals UK drivers are happy to save our crumbling road.* [Link](#).

3. The scheme must not rely on a massive shift to public transport or other transport modes

Road pricing schemes should not be about forcing drivers out of their cars. One reason for this is that Britain simply does not have the public transport infrastructure to make up for all the journeys we make by car. What's more, public transport, cycling, and walking are often not suitable for those with accessibility issues. If road pricing works, it is by making more efficient use of the roads so that driving can be improved, not by pricing people off the roads altogether. In fact, many journeys will be much cheaper under the road pricing scheme proposed here, because it will replace fuel duty and Vehicle Excise Duty.

Road pricing should be an alternative means of structuring the existing payments drivers make so that the roads can be made to flow freely, to the benefit of all. In existing road pricing schemes, such as in Singapore, driving has generally not fallen overall. Instead, it has been staggered so that it comes either before or after peak times. In the age of working from home, Zoom, and flexible hours, it is clear how workers may adapt and adjust so they can save money under road pricing. For those who need to travel at peak times, they may of course change to buses, trains, trams, or bicycles if available and if they so desire, but they will now be able to guarantee rapid travel by car to where they need to go.

4. Road speeds must rise, so that drivers enjoy free flowing roads

Every driver hates being stuck in traffic-it is close to a human universal. Successful implementations of road pricing schemes have led to faster roads and much lower traffic. Even the relatively simple congestion charge in London led to over 20% faster road speeds in the affected zone. The Government, in implementing road pricing, must make a credible commitment that the rates will be adjusted over time so that road speeds rise to a sustainably higher level. This could mean, for example, measuring road speeds in key places in British cities, and committing to continual increases in these over the remainder of the current parliament and into the future.

This would be a large benefit to all drivers. If drivers are paying only the same amount in tax, but gaining freer flowing roads, they are making a net benefit-something that is crucial to overall acceptance of the policy. As we will see, there may be other benefits that tilt this even further towards net overall gain for the motorist.

5. Commission a study to assess whether speed limits on motorways can be safely raised to 80mph

National speed limit was set at 70mph in 1965, at a time when Britain had no speed limit on unrestricted roads. Despite the fact that dramatically fewer people owned cars and drove, and the fact that journeys were generally shorter and slower, vastly more people died on British roads in the 1960s. Almost 8,000 died in 1966. But 1960s roads and cars are very different to those we drive today. In the 2010s, every year has seen fewer

than 2,000 deaths, or one death every 436 million kilometres driven. This rate is forty times lower than the 1960s, reflecting the enormous safety improvements we have seen since then: ubiquitous airbags and seatbelts, assisted braking, power steering, artificial intelligence, crumple zones, and so on.

A speed limit of 80mph, which might not have been safe for much of our history, may now be safe. The Government should therefore commission a study to assess whether the speed limit on motorways can be safely raised to 80mph.

Implementing a new 80mph motorway speed limit alongside a road pricing scheme would reassure motorists that the key goal is to improve the experience of driving and speed up journeys, rather than burden them with yet another charge.

6. Spend more on new roads and on repairs

Since a successful road pricing scheme will not raise any extra funds compared to the status quo, and since it will deliver either cheaper or quicker journeys to everyone driving, it should be a net improvement for nearly every driver, even if the roads budget were kept constant. However, shifting more of the revenues from road user charging towards improving road infrastructure would underline the intention of the policy: to improve motorist wellbeing.

Applying road pricing to the UK

Road pricing could be rolled out across the UK in one of three broad ways.

- I. National roll-out in one go
- II. Regional or local roll-out
- III. Implementation by vehicle type

There are virtues to each of the options. Either of the steadier options give us a chance to make sure the technology is working perfectly. The national unified policy is mainly superior because it allows us to align reductions in VED and fuel duty with money coming in from the replacement system. The other rollouts will not allow for this, and there will have to be a period of either increased taxation of motorists or reduced. Both have obvious drawbacks.

I. National roll-out

A national roll-out would mean applying road pricing across the country at the same time, to all of the roads it will end up covering, and to all of the vehicle type it will cover, after local trials to prove and stress test the technology used.

A national roll-out has two key virtues. Firstly, as mentioned above, since the entire country, all vehicles, and all road users will be covered, revenues from road pricing can be controlled to cover declines in existing charges. As shown below, any scheme that does not apply universally will

lead to either overcharging road users or significant financial shortfalls for the Treasury and extra congestion.

Road pricing could be introduced at its full eventual rate straight away, or steadily over several years. Steady implementation would blunt the distributional effect on any of the small groups who are significantly affected, and allow more steady adaptation, although it also means that any benefits of the scheme will be less pronounced. For example, charges may be set too low to substantially reduce congestion.

The second virtue of a national roll-out is that the benefits of the regime change will be clear almost immediately. Road speeds will go up and those willing to drive at off-peak times will immediately see financial gains. Other methods will tend to see benefits phase in only slowly, and they may therefore be less tangible and obvious.

The downside of a national implementation scheme is that there are less opportunities to gain the consent of the affected motorists, and there is less experimentation and learning along the way. Implementing road pricing locally, regionally, or by vehicle may mean that necessary improvements and tweaks can be done along the way, for an overall smoother and more successful system.

II. Regional or local roll-out

As shown above, most successful real-world implementations of road pricing have happened in individual cities or areas. Many of these have survived multiple elections, including power shifting between parties of different ideologies. These have generally achieved political acceptability by, for example, making sure that revenues from the charge are used towards local priorities.

Creating a framework that can be adopted by city regions, counties, district councils, or some other administrative geography within the UK may therefore be a promising way to streamline adoption.

This could involve, for example, creating the basic technology then offering this out to cities or other regional administrations. They would be able to install the technology and keep some fraction of the revenues if they did. Then, residents from within this area would be able, in paying their charges, to claim rebates from the central government for fuel duty and Vehicle Exercise Duty. To avoid having to claim a rebate, they might be given the option to digitally attach their car's registration number to their driver's licence to their vehicle number plate so that simply showing their driver's licence would automatically let them buy fuel free of duty. In this way, they would avoid being double charged for the road.

The success of the systems in reducing traffic and increasing road speeds would be examples of what was possible to the rest of the country. It would also give 'follower' cities the chance to observe and learn from those who implemented earlier. The unified technology covering the country would also reduce the cost of individual cities building systems. But the steady roll out would reduce the cost of building this technological infrastructure all in one go.

From the perspective of politics, the main advantage for the central government would be avoiding any ill favour seen while the policy was being adapted to. Certain motorists may perceive themselves as losing out, even where motorists overall benefited. This blame may be lessened and more evenly distributed where the decisions were taken locally.

The main cost for the central government is that any regional adoption that did devolve decision making would almost certainly also have to share revenues. Therefore, any such scheme would also raise less revenue for the central government than the prior fuel duty and Vehicle Exercise Duty systems, or charge drivers more overall. As the paper has shown, charging drivers more overall will doom any road pricing system in a country of motorists. So the Government may find this system of implementation less attractive.

There may also be longer term problems if not every administrative unit decides to go for the road pricing alternative. At some point there will be two parallel systems, and the government may wish to unify these, but will have to do so without the local consent of some regions. It may also be considered messy or complicated for drivers to have to claim rebates, though these may be subject to automation.

III. Implementation by vehicle type

The UK Government is already considering a road pricing system for heavy goods vehicles, taking inspiration from the German system that falls only on them. This system has virtues similar to the regional system. Like the regional implementation system, it allows us to trial the technology in real world conditions before applying it to the country at large.

Most drivers do not drive vans or lorries. It is widely accepted that vans and lorries, with axle weights dramatically higher than cars, do disproportionate damage to roads, and cost society much more in repairs. Delivery vans also account for a large amount of congestion in urban areas. These three facts mean that motorists in general may see at least this first extension of the scheme as fair. It will also mean less lorry traffic in peak hours, which should benefit the average driver. Such a roll-out could proceed from lorries to delivery vans,

This implementation mirrors the Singaporean system's extensions in the 1970s, 1980s, and 1990s, although in reverse. Singapore moved from private cars through vehicle types. The benefit of the Singaporean system was that private drivers became a natural force for wider application once they saw other road users avoiding the charge. There was also arbitrage: people began using larger vehicles for normal private trips to evade payment. Starting with HGVs may see a similar public pressure for extension, but also may not, since the larger majority of road users are not covered in the initial schemes.

A vehicle type roll-out would make a rebate scheme relatively easy.

There would also be the potential to make further roll-out of this scheme (past vans, lorries, and delivery vehicles) voluntary. Road users

could gain the ability to rebate their fuel duty and Vehicle Exercise Duty if they opt to be charged for road usage. The main issue with such a scheme is ‘cream skimming’: the people most likely to switch over would be those who would benefit most from the scheme. This means that revenues would fall, and traffic congestion would not fall much.

Some of the problems of voluntary switch-over could be resolved by the Government committing to a future date of obligatory switching. At that date, everyone would have to switch to road pricing, and fuel duty and Vehicle Excise Duty would be abolished, rather than rebated to those under the newer system. If this date was credible, and not too far in the future, it could generate a best of both worlds’ scenario, blunting the effects of the changeover without reducing the large long-term benefits. However, the current controversy around the Government’s planned prohibition of diesel and petrol cars will be illustrative: if this promise is not kept to then it may not be possible to keep to the road pricing commitment, and vice versa.

Overall, a vehicle type roll-out has attractive features if it can be made politically credible but could have significant costs without substantial benefits if political considerations mean adoption is halted halfway. The other implementation options, by their nature, suffer less from this problem.

What exactly to charge for

There are four important features that vary between cars that determine the ideal road pricing scheme:

- Axle weight and road damage
- Local air and noise pollution
- Global pollution and carbon
- Dynamic congestion charge

A scheme incorporating all four of these has been called ‘next generation road pricing’. However, while all of them are important, not all of them require road pricing to be accurately captured. For example, reflecting the congestion costs of driving does require something like road user charging. Fuel duty and Vehicle Excise Duty do not do the job, because they do not vary closely with how busy a road is. By contrast, fuel duty and Vehicle Excise Duty do vary with carbon emissions. Less efficient cars use more fuel, paying more duty, and are charged more annually to keep on the road in the existing road tax system.

Such a charge would vary based on four key measures.

Firstly, there would be a per mile charge, likely with a certain number of free miles per year so that those driving very little do not face any tax. This would be a relatively small component of the overall price, and would vary with axle weight, to account for the dramatically higher damage that HGVs cause to roads.

Secondly, there would be a local pollution charge, which would vary partly in line with the features of the vehicle and partly with the features of the place it is being driven. A noisier car whose exhaust pumps out more particulates and carbon monoxide would pay more than a quieter electric car. And cars would pay more for polluting (or making noise) in or near places where people live.

Thirdly, there would be a carbon charge, which would be zero for Zero Emissions Vehicles, low for Low Emissions Vehicles, and higher for inefficient polluting vehicles.

Fourthly, finally, and economically most importantly, there would be a dynamic congestion charge. Unlike London's congestion charge this would not be flat for the whole day, apply equally on weekends, and cover a blunt encircled area. This need not mean that there is 'surge' pricing: prices could be set annually or monthly rather than each day. The price to drive in peak times in a given place would be determined by demand for that road. This would mean that the congestion price for rural roads might be zero much of the time, and even might be close to zero in the city at night. By contrast, driving inside urban areas would be expensive, and things would be especially expensive for those constantly on the road, such as Amazon delivery drivers.

The economically ideal system will track these precisely in line with their externality costs; a practical political solution may involve some imperfections relative to the ideal system but should still be guided by these four categories.

The technology of the system

Around the world there are three main systems that have been used for congestion charging, road pricing, and tolling.

Option 1: Gantry-based toll road

The first is the standard gantry-based system that is familiar to everyone from toll roads, bridges, and tunnels. This can now be automated, to speed up entry and exit. A system like this was used for the original incarnation of Singapore's flexible road pricing scheme. In general, the downside for this scheme is that it would be almost impossible to apply nationwide, as it would be enormously expensive to install at such a scale. It can be used effectively for major trunk routes, and cities with few entrances and exits, but not for a broad system that is supposed to apply to small as well as large roads.

Option 2: Automatic Numberplate Recognition (ANPR)

The second is ANPR. ANPR is familiar to the British as it is used not only for London's congestion charge, but for its ultra-low emissions zone as well. Generally, it is an improvement over gantries since the infrastructure should be cheaper to install, and because regular surveys of cars moving in a given area helps with enforcing laws around e.g., driving without insurance. However, like gantries using this system would be prohibitively

expensive for a universal scheme. Using ANPR would limit roll-out to major trunk roads and the centres of certain cities. Even so, it may have problems in terms of cost.

Option 3: A black box system

The third is based around a black box or another means of doing location tracking. Recently, Singapore has shifted to this system. This system has many positive features compared to ANPR and gantries. It is cheap to scale once the system is in place, and easy to adjust over time, and it can be applied to smaller roads at no extra cost over trunk systems and central cities. However, in Singapore black box installation turned out to be relatively expensive (though still vastly cheaper than any ANPR or gantry scheme). If black boxes are used to apply prices in real time or retrospectively, that will seem unfair and inconvenient to many users, who wish to know the cost of a given trip in advance.

Installing black boxes in new cars will be cheaper than retrofitting cars currently in use, so the bulk of the expense will be in retrofitting. It may be that black boxes can be retrofitted at lower cost than when Singapore last updated their system. This would make them the most attractive option for implementation, with the government paying the cost. The first year of road pricing could include rebates for fuel duty and road tax (with abolition on year two). Installing a black box could give users eligibility for these rebates. Afterwards, there could be a limited period of leniency, then penalties for driving without a box, enforced via ANPR in the existing camera network.

Singapore recently contracted for a system that cost roughly £300m for their nearly 1m cars one-off to install the location receivers. At a similar price for Britain's 30m cars, we might spend £9bn in the first year, with the government paying for the installation. This system would need some ANPR cameras for enforcement, to make sure receivers are not taken out of cars in order to scam the system. These would automatically check that a given car's number plate was associated with a registered car, and that the receiver was not currently stored at home. This is already done for Vehicle Excise Duty and for insurance, as well as the London Congestion Charge, and so would be an evolution of the status quo, rather than a revolution.

The location trackers could be placed in an inconvenient place to remove and would help track stolen cars. In future, car companies could pre-insert the receivers so they would be impossible to remove, and, through technical synergies, perhaps cheaper to update and adapt.

Option 4: An app-based system.

One way of improving over black boxes could be using an app. Road users would register their vehicle and their insurance with the app. The existing ANPR network and a set of mobile ANPR would verify that cars were not being driven without registration and paying. As discussed above, a bundle of free road pricing credit could be given to everyone to give a

carrot for sign-up, and so those driving very small amounts would not be hit.

A major benefit over the black box would be the ability to see and know the price of any trip in advance. Drivers could put their journey in and get the price before they go out, as with ride hailing apps such as Bolt. This would help them decide between different times and save money. The largest risk of the pure app system is evasion—a hybrid system with a simple location tracker in the vehicle, and an app on top, may be superior. This would also allow users to drive without checking the price, which may be important for convenience.

Legal implementation

The Transport Decarbonisation Plan announced the review of the National Networks National Policy Statement, the primary planning policy applicable to new road projects. Government should use the opportunity to widen the scope of road user charges beyond river crossings. Indeed, amending the National Networks NPS to at least consider the need for any new or improved road proposals to entail road user charging is likely the fastest way to ensure its delivery.

5. Conclusion

Generations of economists have pointed to the roads as a canonical example of the tragedy of the commons. A lack of pricing leads to congestion. This congestion causes enormous social and economic costs.

However, rather than seeing this as a cost imposed upon drivers, economists and politicians have tended to see the result as a cost drivers impose upon society. Framing it in this way has meant that each time politicians turned towards road pricing, they have burdened the policy with swingeing terms meant to punish the British motorist.

This paper is one of the first that approaches this question from an entirely different set of assumptions: the assumption that British people have the right to enjoy the freedom and other benefits they get from the car. Any policy of road pricing must work for this lion's share of the British public.

Working out such a policy may be difficult. Hopefully this paper makes a substantial contribution to enumerating the conditions Britain's drivers may reasonably put on any road pricing scheme that emerges. However, if these conditions can be met, the benefits outlined by economists are still available and very large.

A Government that was able to square this political-economic circle could benefit the country enormously, bringing millions of Britons within range of better jobs by saving them millions of hours they otherwise would have spent in traffic.



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Policy Exchange
8 - 10 Great George Street
Westminster
London SW1P 3AE

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