



RE-CHARGING BRITAIN'S ROADS POLICY

Greener Transport Solutions supplementary written evidence to the Transport Select Committee Inquiry into Zero Emissions Vehicles and Road Pricing

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28th April 2021



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1. Introduction

This paper sets out a proposal for a national road pricing scheme, and forms supplementary written evidence submitted by Greener Transport Solutions (GTS) to the Transport Select Committee Inquiry into Zero Emissions Vehicles and Road Pricing.

Road pricing is one of the best fiscal changes that any government could have made over the last generation. It has always been the most effective way to tackle road congestion and pollution, and now there is a fiscal imperative with the prospect of a £40 billion hole in the public finances as receipts from road taxation disappear.

The showstopper has been that road pricing is considered politically too difficult. But now we face a new dilemma. With petrol and diesel vehicles (ICEs) to be replaced by electric vehicles (EVs), who pays for Britain's roads?

2. Inquiry into Zero Emissions Vehicles and Road Pricing

In its original written evidence¹, GTS welcomed the Inquiry for putting a spotlight on two key issues central to decarbonising transport:

- We need to accelerate the shift to zero emissions vehicles. At the same time, some form of road pricing will be essential. Firstly, to replace receipts from fuel duty and Vehicle Excise Duty (VED) as the vehicle fleet gets cleaner (annually £28bn is received in fuel duty; £6bn from VAT on fuel, £6.5bn from VED). Secondly, to reduce vehicle mileage.
- There is no such thing as a zero emissions car. The manufacture and disposal of batteries, vehicles, electricity generation and civil engineering must also decarbonise. We need to shift to a more intensive use of a smaller fleet of vehicles and to encourage behaviour change.
- Simply replacing ICEs risks locking in car dependency and increasing congestion. Road traffic will increase as motoring costs get cheaper unless we transition from fuel duty to a new way of paying for road use. The challenge is how to introduce road pricing in a way that can be delivered politically, and which doesn't disintendivise the switch to EVs.
- We need a system that can levy tax on both ICEs and EVs fairly. It would be inequitable in the extreme if road infrastructure was financed from general taxation. This would mean non car owners, a high percentage on low income, cross subsidising motorists. There are also serious equity issues to be addressed with regards purchasing of EVs.

3. The scale of the challenge

Transport is the biggest emitting sector of the UK economy. Road vehicles are responsible for 90% of transport emissions². As hosts of the COP26 UN climate summit in November the UK urgently needs a credible plan for decarbonising road transport.

¹ [Greener Transport Solutions' evidence to the Transport Select Committee into zero emissions vehicles and road pricing, Claire Haigh, February 2021](#)

² [The Road to Zero, HM Government, 2018](#)



The scale of the EV challenge is immense. Of the UK's 32.9 million car fleet, just 1.1% is ultra-low emission and less than 0.5% is fully electric³. Manufacturing needs to scale up massively. At the same time, significant consumer barriers need to be overcome.

Transport Focus reveals that 46% of people unlikely to buy an EV cite cost as a major barrier, and 44% would be concerned about where they could charge. The Social Market Foundation has shown that low income groups are significantly less willing to pay for new EV charging infrastructure, and people who rent find it much harder to access charge points.

These equity and affordability issues must be addressed. EVs cost approximately £10,000 more than ICEs. Households in the bottom 40% income deciles mostly buy second-hand cars. A second-hand market for EVs rapidly needs to be developed. Consumer confidence will also require a massive scaling up of infrastructure for EV charging points.

4. EVs are not a panacea

The 2030 ban on sales of new petrol and diesel cars alone won't bring about the necessary reductions in emissions. Progress to improve efficiency of new vehicles has been largely offset by their increased use, and the tendency to larger vehicles. Average CO2 emissions of new cars increased in 2017, 2018 and 2019.⁴ It is estimated that we will need to reduce traffic on our roads by between 20% and 60% by 2030⁵.

Simply replacing ICEs with EVs risks locking in car dependency. The risk is that in lowering the cost of motoring, electrification will increase car use and congestion and make mode shift to public transport and active travel harder to deliver. If we electrify the car fleet without sorting out how to transition away from fuel duty, road traffic could increase by 30%, which in addition to the 40% traffic increase already predicted will lead to increase of 70% by 2035⁶.

5. Proposal for a national road pricing scheme

The tricky problem to solve is how to phase in road pricing in a way which can be delivered politically, and which doesn't disintendivise the switch to electric vehicles. Our contention is that there would be little appetite in Whitehall for a "Big Bang" introduction to road pricing. Instead, road users should be incentivised to opt-in to a new way of paying for road use.

i) Replacing fuel duty and VED with a new road user charge

To coincide with the ban on sales of new petrol and diesel cars, government should signal that from 2030 fuel duty and VED will be abolished and replaced by a mandatory road user charge based on distance and time which will apply to all road vehicles. The distance charge to pay for road infrastructure and the time charge to cover congestion and pollution.

Ahead of it becoming mandatory in 2030, road users will be encouraged to opt-in. The new road user charge will be independently determined and monitored (next section) but should not in aggregate cost more than the current system and may save users money as it will

³ [Reducing carbon emissions from cars, National Audit Office, February 2021](#)

⁴ [The Sixth Carbon Budget, Committee on Climate Change, 2020](#)

⁵ [More than electric cars, Transport for Quality of Life briefing for Friends of the Earth, 2018](#)

⁶ [The Unintended Consequences of Freezing Fuel Duty, Prof David Begg & Claire Haigh](#)



incentivise travel at less congested times. It may be cost effective for drivers in rural areas for example to switch from paying fuel duty in most circumstances.

The distance charge is set at 2p per km for cars, and an average of 3p per km for vans and 6p per km for lorries. The charge for lorries and vans would increase in line with weight per axle and wear and tear to the road surface. For cars a flat rate charge of 2p per km is recommended as the weight of a car is marginal to the damage inflicted on road surfaces.

[ANNEX I: Paying by Distance and Time; ANNEX II: Setting the new charges]

The recommendation to move away from VED shifts the burden of taxation away from fixed annual costs towards variable costs. This allows a closer linkage between road tax and infrastructure costs, congestion and emissions. A driver who travels 60,000 km per annum, for example, imposes a much higher cost than a driver who only travels 6,000 km per annum. Current VED charges do not reflect this. Shifting the burden away from ownership to use increases the propensity to walk, cycle or use public transport.

Full details of how the opt-in would work for existing petrol and diesel vehicle drivers is set out in *Paying for Road Use*⁷. The new charge would be administered by 'Mobility Account Providers' and regulated by the Office of Road and Rail.

ii) Taking the politics out of motoring taxation

We propose that government sets up a Commission with cross party representation to agree a way forward. The Commission would consider delegating authority to an independent body such as the Office of Road and Rail (ORR) in consultation with the Office of Budget Responsibility (OBR) to set motoring taxation going forward. This would build cross party support and politically de-risk the introduction of road user charging.

The precedent for this is taking the politics out of the setting of interest rates and leaving it to the Bank of England to make the decisions which are right for the economy. In the same way that the government asks the Bank of England to meet inflation targets they should ask the ORR/OBR to establish the right level and mix of motoring taxation to meet targets in public finances, road infrastructure spend and set targets for congestion and air quality.

Road users should be given a clear time horizon of how motoring taxation is going to evolve. One of the first proposals from the ORR/OBR that we could anticipate is a ten-year trajectory for fuel duty increases to encourage the switch to EVs and more sustainable travel modes.

iii) Incentivising purchase of EVs

From 2023, EV car buyers will be offered a third off the price for models up to £35,000, in exchange for committing to pay the new road user charge. These vehicles will for the remainder of their life pay the charge.

⁷ [Paying for Road Use, Professor David Begg, July 2018](#)



Crucially this offer will also apply to buyers of second hand EVs. To ensure that they are not penalised for their early adoption of EVs, existing owners will be given the opportunity to top up their grant if they commit their vehicle to the new road user charge.

iv) Incentivising older vehicle scrappage and purchase of EVs

In addition to receiving a third off the price for models up to £35,000 in exchange for committing to pay the new road user charge, drivers who scrap their vehicles of more than 10 years old can receive an additional £3,000 credit towards the cost of an EV.

v) Implementation

To be politically deliverable, the new way of paying for road use would be implemented in stages. Following an initial pilot scheme to establish and test the technology, the first phase will be optional. The 2030 ban on sales of new ICEs provides the opportunity to make the change in how we pay for road use mandatory.

2021/22	<ul style="list-style-type: none"> • The option of a new way of paying for road use by distance and time, to be mandatory from 2030, is announced in Chancellor’s Autumn Statement as well as the intention to give powers to ORR/OBR to set motoring taxation. • A Commission is set up to establish cross party support for ORR/OBR role in setting charges. • Government to set targets and objectives for ORR/OBR in similar way that it does for the Monetary Policy Committee of the Bank of England
2022	<ul style="list-style-type: none"> • ORR/OBR sets out a ten-year trajectory for fuel duty increases to encourage the switch to EVs and more sustainable modes. • ORR/OBR sets out initial charges for distance and time with the main aim of incentivising road users to opt in and making savings in their annual road tax payments if they cut their external costs. • Pilot scheme for new road user charge to be launched, potentially in one of the Clean Air Zones to trial the technology.
2023	<ul style="list-style-type: none"> • New national road user charge launched giving all road users the opportunity to change how they pay for road use from fuel duty/ VED to the new charge. • ORR/OBR sets out conditions for the new EV grants, including price bands and applicability of different models for new and second hand EVs • EV car buyers are offered a third off the price for models up to £35,000, in exchange for committing to pay the new road user charge.
2024/5	<ul style="list-style-type: none"> • Introduction of schemes using platforms such as Mobility as a Service to encourage road users to opt in to change how they pay for road use, and to incentivise switch to more sustainable modes.
2030	<ul style="list-style-type: none"> • Mandatory for all road users to pay for road use by distance and time.



It is also important that there is cross-party political support for the role of the ORR/OBR in fairly and transparently determining the annual rates of fuel duty and setting the new road user charges, so that the process is depoliticised as much as possible.

Once the new road user charge is established, and a clear trajectory for annual fuel duty increases set, the opportunity will be to use platforms such as Mobility as a Service to incentivize the switch to more sustainable modes.

We also need to ensure that new disruptive technologies, Uber and the ever-increasing switch to online shopping work in the interests of society. Changing how we pay for road use is central if this objective is to be achieved.

7. Conclusion

The switch from ICEs to EVs provides a window of opportunity for an honest conversation about road taxation, and to develop a politically deliverable national road pricing scheme.

The investment case for funding the proposed new EV grants is compelling, as Government would effectively be investing in a new revenue stream to replace the billions it currently receives in fuel duty and VED. With interest rates so low, now is the right time to invest in greening the fleet to secure a guaranteed annual revenue stream.

The proposed national road pricing scheme, combined with the new EV grants, will deliver on key government priorities. This proposal would accelerate the take up of electric vehicles, support the levelling up agenda, boost manufacturing and make the UK a climate leader on the decarbonisation of transport.

About the Authors:

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ANALYSIS BY PROFESSOR DAVID BEGG: Calculations based on 2018 prices

ANNEX I: Paying by Distance and Time

The new way of paying for road use would be based on distance and time. The time element would cover congestion and emissions and the distance element would pay for road infrastructure.

Time is a good proxy for congestion as it enables a higher charge per km in congested urban areas than it does in lightly trafficked rural areas. The impact of emissions is also higher in more densely populated urban conurbations which a time charge picks up while a distance charge doesn't. The charge per hour would vary depending on the vehicles emissions. The time element would be set at the start of the journey based on estimated arrival time and the charge would not be levied on the time the journey actually takes. This is imperative to prevent dangerous driving as road users react to a ticking meter. They should also not have to pay more for unanticipated delays, because of an unforeseen disruption.

The distance element would cover the cost of building and maintaining the road infrastructure. The charges would be based on the wear and tear and damage to the road surface based on different vehicle weights. For car, this would be a flat rate, but for lorries this would be based on weight per axel. A Hummer weights 2.6 times more than a Prius C hybrid but each contributes about the same wear and tear to roads and bridges. However, the heaviest truck fully loaded causes the same amount of road damage as 9,600 cars. However, road maintenance is only one component that the road infrastructure fund would have to cover. There is also investment in road capacity, information systems, accident prevention measures etc. Therefore, cars would also need to contribute to the road infrastructure fund.

A criticism of previous proposals to switch from fuel duty to congestion charging is that it would only encourage rural vehicle users to switch and would do nothing to influence urban users who are travelling on the most congested roads. However, if we add in both a time-based charge and a distance charge then there is little variation in how much a rural and urban motorist would pay per annum with the new opt in charges compared with what they would be paying in fuel duty. This is because fuel duty itself is a good proxy - albeit a crude and less transparent one - for congestion in that in urban driving conditions mph is lower and fuel consumption per mile is higher ditto fuel duty. The key is adding in a distance charge to pay for road infrastructure.

ANNEX II: Setting the new charges

In calculating the hourly charge for vehicles in the 13 different VED bands I have tried to ensure that the new combined charge for infrastructure and externalities is as close as possible to what the road user would pay in fuel duty and VED under the current tax regime. This is important for two reasons:

1. Firstly, it's important to encourage road users to opt in and for the mobility account provider to incentivise their customers to reduce their annual road user tax in a plethora of different ways: car sharing, driving more efficiently, driving safely and within the speed limit, changing the time of journeys, walking or cycling for shorter journeys, switching to public transport, replacing their vehicle with a more fuel efficient one. To ensure maximum take up of the opt in, it's important that the bar is not set too high.
2. Conversely, it's important the government are only paying for reductions in externalities rather than reducing road taxation with no change in externalities. This would represent a dead tax loss for the Treasury.



Charges for cars

VED	VED (£)	g/CO2/km	Litres pa	Fuel duty pa	Fuel duty + VED	Infrastructure Charge (2p/km)	Hourly Charge (£)
Band							
A	0	100	546	316	316	£254	0.23
B	20	110	600	348	368	£254	0.43
C	30	120	655	380	410	£254	0.59
D	110	130	709	411	521	£254	1
E	130	140	764	443	573	£254	1.2
F	145	150	819	475	620	£254	1.39
G	185	165	901	522	707	£254	1.72
H	210	175	955	554	764	£254	1.93
I	230	185	1010	586	816	£254	2.12
J	270	200	1092	633	903	£254	2.46
K	295	225	1228	712	1007	£254	2.85
L	500	255	1393	808	1308	£254	3.99
M	515	300	1638	950	1465	£254	4.59

For illustrative purposes I have made assumptions in calculating the above hourly charges:

1. Vehicle km traveled is the UK average: 12,714km. This gives an average annual infrastructure charge of £254.
2. Vehicles travel at U.K. average speed: 48km per hour.

As the level of the new charges are based on what road users are currently paying I have had to calculate annual fuel duty payments.

I have taken the high point in each VED band to illustrate how the charge is calculated. So, for a vehicle at the top of band D- g/CO2 per km = 130. This has been multiplied by 0.043 to give litres of fuel per 100km=5.59. Multiply by 127 (12,714 - average km travelled divided by 100) and this gives 709 litres of fuel consumed p.a. Multiply this by the fuel duty per km: 58p x 709 = £411 spent on fuel duty p.a. Add the £130 VED and we get total road taxation at £541. With infrastructure charge (I.C) at £254 (2p x. 12,714 km) this leaves £287- the difference between current road taxation and I.C. We divide this by 264 hours (12,714km divided by 48km per hour) and we get a charge of £1.08 per hour to cover congestion and pollution costs.

The infrastructure charge is set at 2p per km for all cars. I looked at varying it based on vehicle weight but was persuaded by the evidence that this has little impact on road wear and tear as far as



cars are concerned. You could argue that an SUV takes up more road space than a Mini and should therefore contribute more to the infrastructure charge. I could still be persuaded by this argument. However, my preference was to vary the time charge to reflect the higher emissions from more polluting vehicles.

It's important to note that the figures above are not based on the charge required to cover externalities. They have been calculated based on the UK average car speed (48km per hour) which gives an average 264 hours travelled per annum. The hourly charge is based on the difference between current annual road tax (VED +Fuel Duty) minus the annual infrastructure charge. So, the hourly charge ensures that the new charges are the same as the current amount paid in road tax if road users make no change to their travel patterns or vehicle type.

The time charge is good way to charge for congestion and it's simpler to communicate to road users than more complex road pricing proposals. The example below is for a car that falls within VED band D, such as a VW Golf SV 1.4, paying approximately £1 per hour. Driving on congested roads where the speed is only 10km per hour would result in a payment of 10p per km, while on free-flowing roads where the speed is 60km per hour the charge would only be 1.66p per km. As the congestion and pollution cost per km rises at low speeds, such as in congested urban conurbations, it is fair that the charge should be higher.

Charges for lorries

With lorries, it is the weight per axle which is the crucial metric in deciding how much damage a lorry does to the road surface. Therefore, the km charge for lorries in this proposal increases with the weight per axle. I have used the VED bands for lorries (they are based primarily on weight per axle) to determine the per km charge.

VED Band	VED Charge (£)	Infrastructure charge (pence/km)
A	165	3
B	200	3
C	450	3.5
D	650	4
E	1200	5
F	1500	6
G	1850	7

The infrastructure charge is based on how much lorries would have to pay to cover the amount they are currently paying in VED. However, this is not the case for VED bands A and B, as the VED charge is so low it would produce an infrastructure charge per km even lower than cars. I have therefore assumed a minimum charge per km of 3p for vans and light lorries. VED rates for lighter commercial vehicles have been based on emissions whereas the VED rates for heavier lorries are calculated on weight per axle and road costs. The infrastructure charge is a fairer way for lorries to pay for roads than VED as it is directly linked to mileage and weight per axle.



Current road tax for lorries:

Weight (T)	VED (£)	Fuel Duty PA (£)	Fuel Duty VED (£)
7.5 (van)	165	6,412	6,577
12-14	200	8,092	8,092
16-18	650	12,824	13,474
26	650	15,389	16,039
33	1200	21,374	22,574
40	1850	23,624	25,474
44	1200	26,588	27,788

New charges for lorries:

Weight (T)	Charge per KM	Annual IC Charge (£)	FD + VED - I.C (£)	Average Annual Hours	Charge per Hour (£)
7.5 (van)	3p	1,920	4,657	1,066	2.15
12-14	3p	1,920	6,172	1,066	5.79
16-18	4p	3,840	9,634	1,600	6.02
26	4p	3,840	12,199	1,600	7.62
33	5p	6,000	16,574	2,000	8.28
40	7p	7,840	17,635	1,866	9.45
44	5p	6,800	20,988	2,266	9.26

The above table illustrates how lorries would be charged per hour for different weights. As with cars, the objective in phase one is to make the new distance (F) and time charge (I) as close as possible in aggregate to what each category of lorry would be paying in VED and fuel duty (D). To calculate fuel duty per annum (C) I have sourced the average mileage and the average fuel costs for each category of lorry from the Freight Transport Association's fuel cost calculator. Fuel duty works out at 64% of the total fuel bill.

The average distance varies with each category of vehicle as does fuel consumption. To calculate hours travelled per annum (H) I have assumed average speed of 60 km per hour.

Note how the infrastructure charge is lower for 44 tonne than 40 tonne. This is because the VED rate is lower for 44 tonne as it has an extra axle, thus reducing the weight per axle.

Note how the charge per km is less for 44 tonne (£9.26) than 40 tonne (£9.45) despite the above. This is because the average distance travelled for 44 tonne is greater than 40 tonne thus increasing the average annual hours (H).