



Let's simplify vehicle tax.

April 2023



loop

Introduction.

Vehicle taxation has become over-complicated and risks falling to zero if left unaltered

Over the years, vehicle taxation has been used by successive governments for a variety of reasons. While the most obvious has been to raise revenue for HM Treasury, its increasingly important role has been as a tool to influence behaviour, where it has frequently operated as both carrot and stick.

However, as a result, once-simple concepts such as the idea of a 'road tax' have become mired in complexity and littered with arcane edge cases that make them difficult to follow and expensive to administer.

For the British Government, the current system has also created a new problem, one that the transition towards electrified vehicles has accelerated: it is costing the Treasury billions of pounds in lost revenue and is on a trajectory that, if left unchecked, will see tax receipts eventually fall to zero.

Various solutions have been put forward to solve this predictable conundrum. Many are more complex than the current system, and are often heavily reliant on the mass-deployment of new technology and infrastructure. This report attempts to make the case for a solution based on simplicity.

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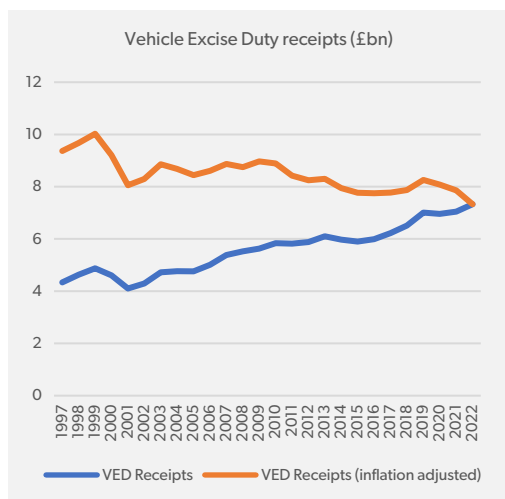
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A tale of two taxes.

And why they've created a problem by being almost too efficient



Two separate duties form the backbone of motoring taxation in the UK. One is silently paid by us all whenever we fill up our cars with fuel. The other is more apparent, and lands heavily on our door mats every year in its inevitable brown envelope.

Vehicle Excise Duty

A 'road tax' has been with us in one form or another since 1889¹, but it was David Lloyd George, then Chancellor of the Exchequer, who decreed in his 1909 Budget that the proceeds should be ring-fenced and dedicated to the construction and maintenance of the road network. The Roads Act of 1920 introduced the tax disc as evidence that the necessary duties for a mechanically-propelled vehicle had been paid, charged at the rate of £1 per horsepower. However, its receipts were never fully spent on road-building alone and were often used for other government purposes, most notably by Winston Churchill who reportedly described the idea that motorists alone should benefit from the taxes they pay as "an outrage upon... common sense."² Ring-fencing formally came to an end in 1937, and since then all proceeds have been paid directly to the Exchequer, further reinforcing the idea that it was never a road tax as such, and more correctly a duty on cars.

In 1948, a flat rate was introduced which survived all the way until 1999 when the Royal Commission on Environmental Pollution recommended the adoption of a two-tier system that saw small-engined cars (1100cc or less) charged £100, while all others paid £155. This rather innocuous change ushered in a new era of complexity for the humble Vehicle Excise Duty.

The 2000 Budget expanded that concept with graduated bands based on CO₂ emissions. Ironically this arose from an earlier proposal that would have seen VED abolished entirely in favour of an increased fuel duty to incentivise buying more fuel-efficient, and therefore less polluting, vehicles. Since then, the number of bands has grown from four to 13, and a new first-year rate (dubbed the 'showroom tax') has been introduced.

The amount of VED due now depends on when the vehicle was first registered, its engine capacity, fuel type, CO₂ emissions, whether it complies with diesel RDE standards, its weight, and even its list price when new. Charges vary from nothing (until 2025, anyway) to £2,605 a year.

And that's just cars. Motorcycles have it relatively easy, paying anything from £24 to £111 depending on the size of their engine, while HGVs are subject to a baffling array of bands dependent on tractor unit weight, trailer weight, number of axles, articulated or rigid, and more, with rates that could see them pay anything up to £1,585 a year. Plus the HGV Road User Levy on top.

But for all its complexity, Vehicle Excise Duty has raised roughly the same amount in real terms for each of the last 25 years, earning around £8.5bn³ on average for the Treasury. Today, VED receipts stand at just over £7bn a year.

¹ House of Commons Environmental Audit Committee, Vehicle Excise Duty as an environmental tax report, 2008

² Is there any such thing as 'road tax'?, BBC, www.bbc.co.uk/news/magazine-23694438

³ ONS, Vehicle duty paid by households + Vehicle duty paid by businesses

Road fuel duty

The Finance Act of 1910 introduced the UK's first fuel duty, applying to what was then called 'motor spirit' at the rate of three old pence per gallon⁴. It was abolished briefly by the Finance Act of 1919 in the face of escalating fuel costs, leaving the freshly-introduced tax disc to perform much of its revenue-raising duties. As petrol prices fell, it was reinstated in 1928 at four old pence a gallon⁵ and has been with us at varying rates ever since.

Norman Lamont introduced the infamous fuel duty escalator in his Budget of 1993, the mechanism by which it would rise by 3% above inflation each year. That escalation rate was increased to 5% by Kenneth Clark a few months later, and to 6% by Gordon Brown in 1997. However, the escalator principle was effectively suspended in 1999, leaving successive governments to sporadically adjust the duty rate to suit prevailing policy or, perhaps more often, to claim credit for freezing it for another year.

Today, road fuel duty stands at 52.95p per litre⁶ having been temporarily reduced by 5p per litre until March 2024 and is levied equally on unleaded petrol and diesel. It currently raises nearly £25 billion⁷ a year for the Treasury.

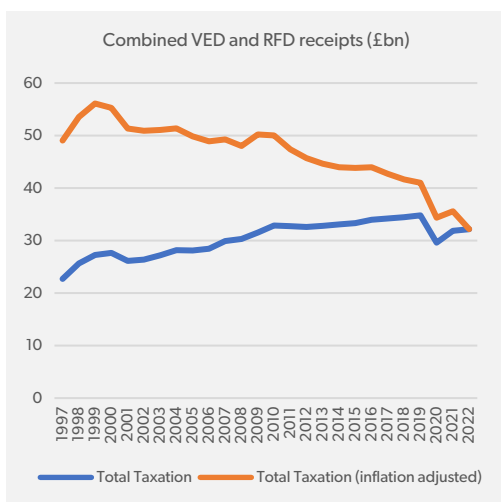
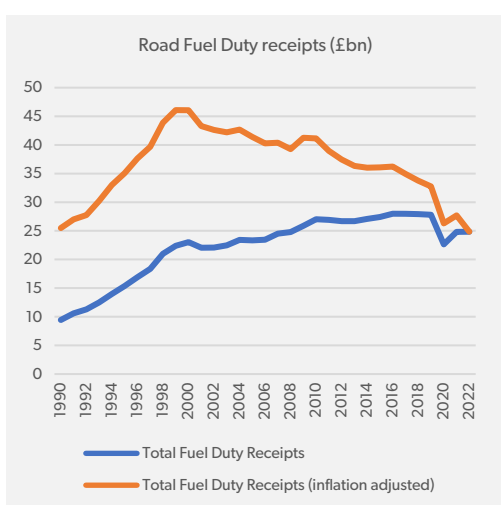
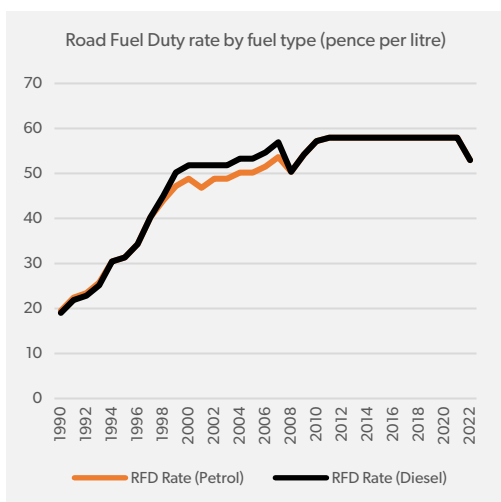
Together these two duties raise £32 billion a year for the Exchequer. Adjusted for inflation over the last 30 years, they have generated an average yield of £46bn a year, peaking in 1999 at just over £56bn in real terms.

Why is there a problem?

Beyond their sheer complexity, these duties now present a much more pressing issue for the Government. They have become almost too successful. They have established a significant source of revenue on which the Government has come to rely, while at the same time leading inexorably to a decline in receipts thanks to the very behaviour they were designed to promote.

The adoption of electric vehicles (EVs) – which are VED exempt for now – and low-emission internal combustion engine (ICE) vehicles has meant that VED receipts are now at their lowest levels. Road fuel duty, meanwhile, has no equivalent for electric vehicles, effectively sidestepping the bulk of the Government's vehicle taxation strategy. In fact, the House of Commons Transport Committee believes revenues from motoring taxation will hit zero by 2040⁸ if the Government doesn't act.

Predictably, this means these taxes must be replaced by a new mechanism, and with some urgency. The longer government waits, the more difficult the situation becomes. Not just because each passing day represents a loss in revenue to the Treasury. But because EV owners are growing increasingly used to paying no vehicle taxation at all, a benefit that will be harder to remove the more firmly it becomes established.



⁴ Finance Act 1910, www.legislation.gov.uk/ukpga/Edw7and1Geo5/10/8/enacted

⁵ Finance Act 1928, www.legislation.gov.uk/ukpga/Geo5/18-19/17/enacted

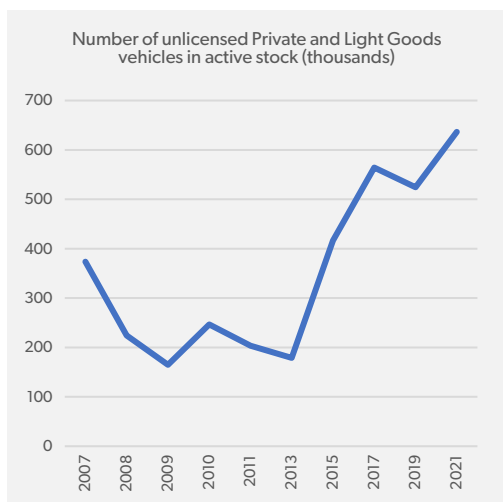
⁶ Historical hydrocarbon oils duty rates, www.gov.uk/government/statistics/hydrocarbon-oils-bulletin/historical-hydrocarbon-oils-duty-rates-2

⁷ Hydrocarbon oils receipts £m, www.gov.uk/government/statistics/hydrocarbon-oils-bulletin

⁸ House of Commons Transport Committee, Road pricing report, 2022

Should old cars be taxed off the road?

And should EVs be tax free?



Years of changes in policy direction have left behind a tangled web of orphaned rules and regulations. The CO₂ bands that apply to vehicles registered between 2001 and 2017 – which had the effect of pushing motorists into buying diesel cars – seem redundant given they apply to cars which are now anything up to 22 years old. There seems little value in charging, say, a 15-year old Chrysler Voyager £675 a year in VED, when it's entirely possible the car itself isn't worth much more than that.

Some suggest these punitive charges help to remove old, inefficient cars from the road. However, anyone driving a 15-year old Chrysler is not about to buy a brand new car. Their budget is likely to stretch only as far as another car of similar vintage and, therefore, emissions.

Insisting on crippling rates of VED for older cars is likely to only achieve two things: first, it increases rates of VED evasion (which are already rising dramatically⁹), since there's no point paying for expensive tax on a cheap car. And secondly, it reduces the residual value of these older cars, making it even harder for anyone to afford to trade up. Even Friends of the Earth¹⁰ agree with this point:

"This issue might be compounded by higher VED charges and higher oil prices reducing the value of their existing more polluting car. In these circumstances, these people would be stuck with their existing car, and also with the higher VED."

It's possible that replacing an old car with a newer, more efficient model can have a positive environmental impact in some cases. However, the need to offset the emissions created in manufacturing its replacement can often mean that achieving break-even, let alone any positive benefit, takes longer than expected. In many cases, it may never occur at all.

For example, at the UK's average annual mileage of 5,300 miles¹¹, it would take almost 10 years¹² for a new, low-emission Volkswagen Golf TSI to claw back the emissions from its manufacture in comparison to our old Chrysler. If the Voyager was replaced by a new, fully-electric Polestar 2, it would take more than 19 years to achieve break-even.

Should EVs be tax free?

There are many arguments on both sides. Originally, incentives were needed to generate demand among consumers and drive the adoption of cleaner vehicles as the country strives to reduce its environmental impact.

But how much stimulation does exemption from a £180 duty perform when purchasing a new vehicle costing an average of £62,000¹³?

In the end, the argument comes down to one simple reality that trumps all others: the Government cannot afford for EVs to be tax-free for ever. And, in the 2022 autumn budget, the Chancellor announced that all zero-emission cars, vans and motorcycles registered since April 2017 will be required to pay not just VED from 2025, but the Expensive Car Supplement, too. The Treasury estimates that this measure will raise an additional £1.6bn¹⁴ in the 2027/28 financial year.

⁹ DfT, Number of unlicensed vehicles in active stock by tax class, VED0202

¹⁰ House of Commons Environmental Audit Committee, Vehicle Excise Duty as an environmental tax, p.14

¹¹ DfT, National Travel Survey, Annual mileage of cars, NTS0901

¹² See Appendix 1

¹³ Electric Vehicle Database, Cheat sheet, ev-database.uk/cheatsheet/price-electric-car

¹⁴ Policy paper, Introduction of Vehicle Excise Duty for zero emission cars, vans and motorcycles from 2025, www.gov.uk/government/publications/introduction-of-vehicle-excise-duty-for-zero-emission-cars-vans-and-motorcycles-from-2025/introduction-of-vehicle-excise-duty-for-zero-emission-cars-vans-and-motorcycles-from-2025

Showroom taxes and additional rates have lost their impact.

When a plug-in hybrid pays more tax than a muscle car, you know it's gone wrong



The 2008 Budget introduced a new first year rate of VED – often called the ‘showroom tax’ – for new cars registered from April 2010. It was intended to stimulate demand for lower emissions vehicles by making cars with CO₂ outputs below 131 g/km exempt from VED for the first year. Those that emitted more than this had their first-year rate progressively increased up to a maximum of £950. That maximum has since increased to £2,605.

However, because the first year of VED is built-in to a new car’s on-the-road price, it is effectively an invisible tax. While some cars became a little more expensive overnight when the new regime was first introduced, car manufacturers soon responded by realigning prices to keep them attractive – so-called ‘psychological pricing.’ It’s doubtful that the average car buyer is now even aware of the different first-year rate, negating any impact it might have on a purchasing decision.

The 2015 Budget introduced a simpler flat rate of VED for new cars registered from April 2017 that effectively did away with the previous CO₂-based regime. It set a standard rate of £140, payable after the first year, which in successive Budgets has since increased to £180 for both petrol and diesel cars.

At the same time, the Government introduced an additional rate – the ‘Expensive Car Supplement’ – that added £310 to the standard VED rate for all cars with a list price over £40,000. This supplement, which has since been increased to £390, is payable for five years from the end of the first licence, after which it reverts to the standard rate.

Since this supplement was introduced, new cars have become remarkably more expensive, yet the £40,000 threshold has not been adjusted to keep pace. This now means, for example, that every car Volvo sells except one is subject to this additional tax. Had the threshold been adjusted in line with the inflation of new car prices¹⁵, it would today be set at nearly £51,000. With electric cars generally much more expensive than their combustion-engine counterparts, it’s not clear what this policy is now expected to achieve.

The result of these various changes in policy is a litany of rules that are difficult to follow, often contradictory and – it could be argued – far removed from their original purpose. Many new cars will now pay three different rates of VED in their lifetimes: the first year rate, a supplemental rate for five years, and a standard rate from then on.

Perverse edge cases abound. A Lexus NX450h plug-in hybrid with CO₂ emissions of just 21 g/km could find itself paying £570 a year, while a 5.0-litre V8 Ford Mustang that emits 299 g/km might pay no more than £180. Similarly, two identical cars registered just a day apart could pay wildly different rates of VED, one £180, the other anything up to £695.

Whatever message this tax system was trying to send, it has long since been lost.

¹⁵ Office for National Statistics, Consumer price inflation time series, CPI Index New Cars, www.ons.gov.uk/economy/inflationandpriceindices/datasets/consumerpriceindices

The current direction of travel.

Nationwide road pricing isn't the only answer

The House of Commons Transport Committee released a report in early 2022 to document their findings from a multi-year road pricing inquiry. It was heartening to read their belief that any alternative mechanism must:

- (a) *entirely replace fuel duty and vehicle excise duty rather than being added alongside those taxes; and*
- (b) *be revenue neutral with most motorists paying the same or less than they do currently.*

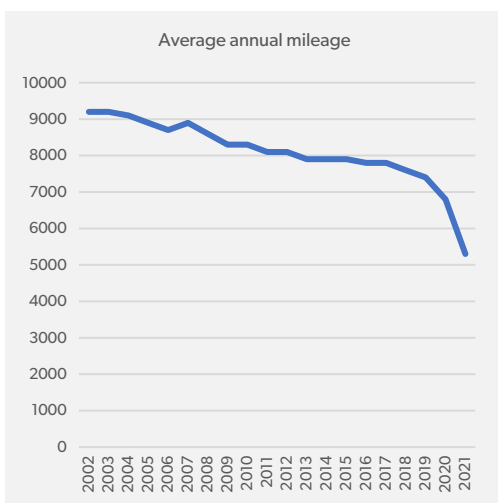
However, the report went to great lengths to suggest that any replacement for VED and RFD should also tackle congestion, which neither of the existing taxes make any pretence towards addressing. This appears to have been the driving force behind the Committee's insistence that "an alternative road pricing mechanism" should "use price as a lever for change."

The Committee heard evidence from many interested parties, some of which were keen to see that motorists should be charged for "the costs they impose on other road users." However, it could be argued that motorists already do. Many studies have attempted to place a monetary figure on the cost of a traffic jam, often in terms of lost productivity to the economy. But assigning some nebulous number to a snarl up rather ignores the most obvious point: the costs of sitting in traffic are already borne by the people sitting in traffic. The lost time, the lost business, the extra fuel – each person already pays. Seeking to levy an additional fine upon them purely for being unlucky enough to be caught up in the tailback of an accident no-one could have predicted seems almost punitive. Imagine having 'surge pricing' applied to your journey as a result of a protest on the M25. Or having to abandon a journey altogether part way through because dynamic road pricing had made completing it unaffordable.

Not only that, but we are no longer living in the 1960s. Dreams of the open road and the idea of going for a 'Sunday drive' are now long gone. Driving has become a chore, and no-one on today's roads does it for fun. Perhaps to prove the point, average annual mileages¹⁶ are falling, and have been for years.

The Committee heard evidence that "the technology required to facilitate an efficient system of road pricing is currently available." Crucially, however, the Committee did not hear evidence on the costs of that technology. At the end of December 2021, there were 40.3 million licensed vehicles¹⁷ in the UK. For the Committee's preferred telematics-based road pricing mechanism to operate, it would require the development, manufacture and nationwide installation of more than 40 million black boxes. It's not clear at whose expense this is expected to happen.

Singapore's deployment of a new Electronic Road Pricing (ERP) system that uses a mixture of GNSS-positioning and roadside infrastructure has been pushed back to mid-2023 due to the global semiconductor shortage¹⁸. Mitsubishi Heavy Industries was awarded \$556 million in 2016 to develop the technology platform¹⁹, including the On-Board Units (OBU) that every vehicle must be fitted with for the system to operate.

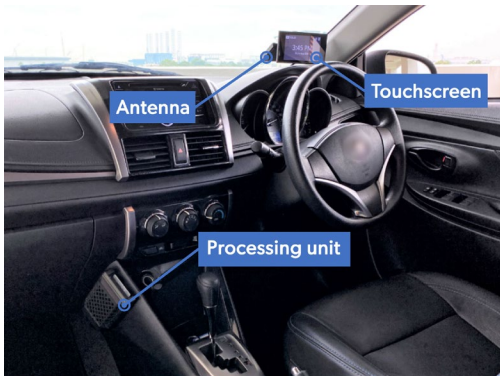


¹⁶ DfT, National Travel Survey, Annual mileage of cars, NTS0901

¹⁷ DfT, Vehicle licensing statistics: 2021, www.gov.uk/government/statistics/vehicle-licensing-statistics-2021/vehicle-licensing-statistics-2021

¹⁸ LTA, Joint News Release by the Land Transport Authority (LTA), NCS Pte Ltd & MHI Asia Pacific Pte Ltd - Installation of On-Board Units for Next-Generation ERP System Delayed to 2023 Due to Global Microchip Shortage, www.lta.gov.sg/content/ltagov/en/newsroom/2021/11/news-releases/installation-of-obu-for-next-generation-erp-system-delayed.html

¹⁹ MHI and NCS Win Singapore's Next-generation Electronic Road Pricing System Project, www.mhi.com/news/1603091964.html



The Land Transport Authority (LTA) will cover the cost of first installation²⁰ for Singapore-based vehicles, with each unit costing \$155.80²¹. However, it is expected to take at least 18 months before the country's 988,755 vehicles²² have been upgraded to the new platform. At that pace, it would take 60 years to equip the UK's transport sector with the required hardware, and cost the government more than £5.2 billion for the OBUs alone.

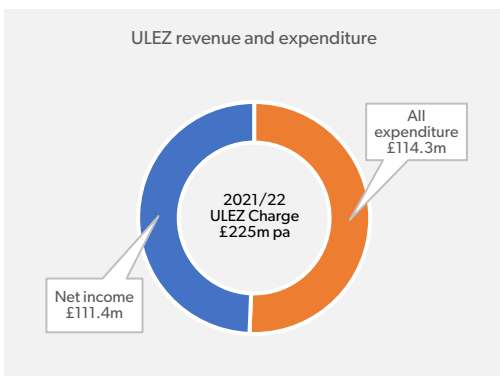
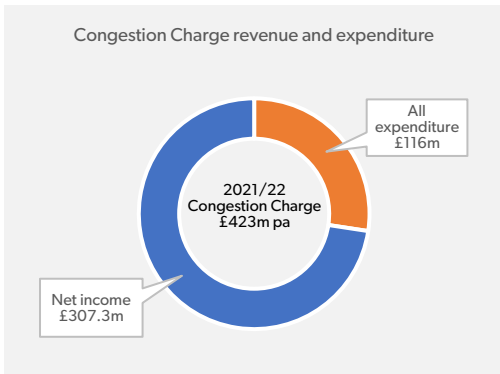
Nor did the Committee hear evidence on the costs of administering a national road pricing system. Transport for London's Congestion Charge is confined to a relatively small area of 21 square kilometres²³ and, in the 2021/22 financial year, it raised just over £423 million²⁴. However, operating the scheme incurred costs of £116 million – almost a third (27%) of all revenue.

The Ultra-Low Emission Zone (ULEZ), meanwhile, earned TfL over £225 million but cost more than £114 million to operate – more than half of the revenue it raised.

If VED and RFD are to be replaced with a nationally-deployed road pricing system, it seems important to suggest that the costs of operating such a scheme could quickly erode the revenue it generates. Instead of needing to raise £32 billion to honour the Transport Committee's assertion that any road pricing scheme should remain revenue-neutral, might it in fact have to raise many billions of pounds more than this?

Despite these concerns, the Committee's report concluded that they had "not seen a viable alternative to a road pricing system based on telematics."

But what if there was an alternative?



²⁰ Installation of On-Board Units for Next-Generation ERP System to Commence in Second Half of 2021, www.lta.gov.sg/content/ltagov/en/newsroom/2020/9/news-releases/installation-of-on-board-units-for-next-generation-erp-system-to.html

²¹ LTA, Electronic Road Pricing (ERP), onemotoring.lta.gov.sg/content/onemotoring/home/driving/ERP/ERP.html#_Paying_ERP

²² LTA, Motor Vehicle Population by Type, www.lta.gov.sg/content/dam/ltagov/who_we_are/statistics_and_publications/statistics/pdf/MVP01-1_MVP_by_type.pdf

²³ TfL, Congestion Charging & Low Emission Zone Key Fact Sheet, content.tfl.gov.uk/cclez-online-factsheet-apr22-jun22.pdf

²⁴ TfL, Annual Report and Statement of Accounts 2021/22, content.tfl.gov.uk/tfl-annual-report-and-statement-of-accounts-2021-22.pdf

Simplifying Vehicle Excise Duty.

Sweeping away years of orphaned policies

Vehicle Excise Duty raised £7bn for the Treasury in 2022; roughly £2bn from businesses, £5bn from households. If we wanted to replace the existing multitude of regimes with a simpler flat rate for each vehicle class, what might those rates look like?

Even taking pre-pandemic VED evasion rates into account, applying typical standard rates from the current system across all vehicles in each class (see table below) leads to an increase in revenue over today's system.

Continuing the VED exemption for all historic vehicles would cost an estimated £155m²⁵. The Department for Transport does not provide statistical data on the number of VED exemptions for disabled vehicle owners, but it seems likely this exemption could also continue without causing receipts to drop below current levels.

Given motorcycles would contribute only £155m in VED receipts, it would seem possible to offer a split rate for powered two-wheelers at relatively little cost. Bikes and mopeds with engines below 125cc, popular with those on restricted licenses, could benefit from a reduced rate of, say, £25 pa. This concession would cost roughly £26m²⁶ to implement.

Even with these concessions, a simple flat rate of VED that swept away the various orphaned policies would be easier to understand, cheaper to administer, and yield the same revenue for the Treasury.

	Cars	Motorcycles	LGVs	HGVs	Buses	Other	Total
Licensed vehicles ²⁷	33,101,930	1,449,599	4,613,316	538,605	146,288	834,069	40,683,807
Evasion rate ²⁸	1.6%	3.7%	N/A	0.7%	0.7%	0.2%	
VED rate	£180	£111	£320	£350	£330	£180	
Revenue	£5,864m	£155m	£1,476m	£187m	£48m	£150m	£7,880m

²⁵ See Appendix 2

²⁶ See Appendix 3

²⁷ DfT, Licensed vehicles at the end of the quarter by body type, VEH0101

²⁸ DfT, Number of unlicensed vehicles in active stock by tax class, VED0202

Implementing an Electric Vehicle Duty.

Replicating road fuel duty for electric vehicles

Road fuel duty for petrol and diesel vehicles has often been described as the 'perfect tax.' The more fuel a motorist uses, the more tax they pay, whether that's because they travel further, more frequently, or in a heavier or less fuel-efficient car. It is collected at little expense on the Government's behalf, and is almost impossible to evade.

Petrol and diesel vehicles will continue to be in use long after the ban on sales of new ICE vehicles comes into force in 2030. It would seem to make little sense, therefore, to remove such a 'perfect' tax from a fleet of vehicles where it is already firmly established in favour of an alternative mechanism that is unlikely to demonstrate a similar level of efficiency. Doing so would, to borrow a phrase, seem like throwing the baby out with the bathwater.

Since the problem is largely caused by the growing use of electric vehicles, the logical approach would be to introduce a mechanism that functions as effectively with EVs. The House of Commons Transport Committee did briefly touch on this point when they noted:

"...a way might be found to price electricity used by vehicles differently. That could be done by introducing a roads surcharge on electricity used to charge vehicles. Yet, as Mr Williams pointed out, this would require potentially costly new infrastructure, because there is currently 'no mechanism for my supplier to know if I am using the washing machine or charging a car.'"

This seems a rather curious conclusion to draw when the Committee's preferred solution – nationwide road pricing – would be entirely reliant on costly new infrastructure. It also appears to demonstrate that the problem is being approached from the wrong angle.

Charger-based reporting

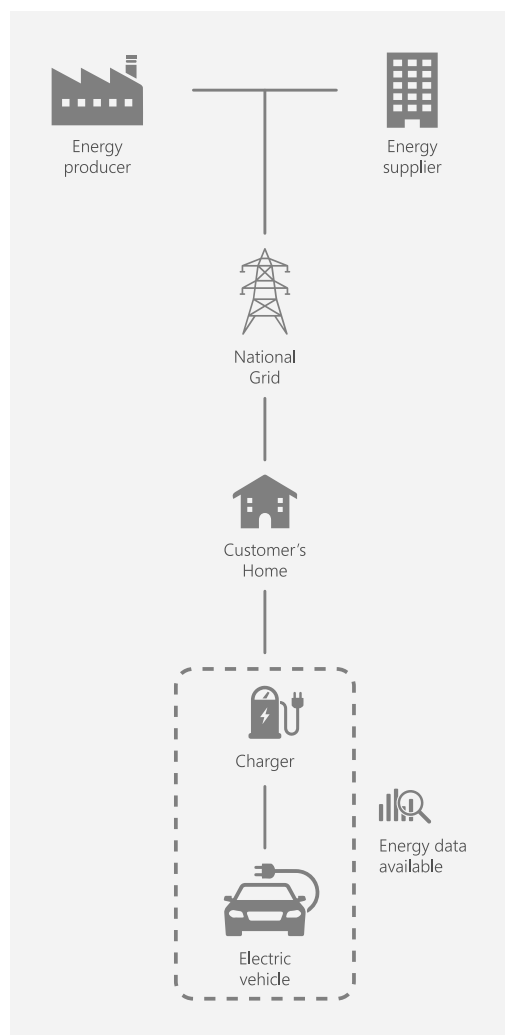
As the Committee rightly points out, it is currently impossible for any upstream provider to know whether the energy they supply is being used to power a washing machine or charge a car. However, once the electricity reaches the EV charger, it can only be used to recharge an electric vehicle, and should therefore be subject to duty. That makes the charger the ideal point at which to capture the information required to levy an EV duty.

Public charging stations are already connected to a network to enable payment processing, and updating these to include EV Duty in the billable amount at the end of a charging session would require little more than an over-the-air software update.

Most home chargers are already of the 'smart' variety and are therefore capable of keeping track of the energy consumed and reporting it to the customer's electricity supplier. EV Duty could then easily be applied to the customer's bill along with the other taxes such as VAT.

The Electric Vehicles (Smart Charge Points) Regulations²⁹ require all chargers installed from July 2022 to include smart functionality, whether in a domestic or workplace setting. This includes the ability to send and receive information, manage energy flows, and support demand-side response services to help reduce the strain on the National Grid.

This means all the infrastructure required to implement a simple per kWh duty is already being installed.



²⁹ Electric Vehicles (Smart Charge Points) Regulations 2021, www.legislation.gov.uk/uksi/2021/1467/contents/made



Couldn't I just use a 3-pin plug to get around all this?

Running an EV on energy on which the duty has not been paid would become illegal in the same way using red diesel is today.

Domestic 3-pin sockets are not designed to run at their maximum capacity for hours on end and doing so carries a risk of overheating, according to some experts.

Even if made electrically safe, at a maximum charge rate of just 2.3kW, it would take more than a day (26 hours, in fact) to charge a Renault Mégane E-Tech. That's a bit like boiling a kettle, over and over again, all day and all night, something your electricity supplier would likely notice. As it could be argued that would make them complicit in an act of tax evasion, it would perhaps be in their interests to notify HMRC.

Plus, in this age of 'digital' government, it would be trivial to cross-reference databases from the likes of the DVLA to reveal those EV owners who weren't paying their fair share of duty.

Recharging via a 3-pin socket could also work out more expensive: the Electric Vehicle Smart Charging Action Plan outlined the Government's belief that high mileage motorists could save as much as £1,000 a year by using a smart charger.

Vehicle-based reporting

There is an alternative, if less elegant, option. Most electric vehicles already carry more than enough computing horsepower to record the amount of energy delivered during each charging event, as well as the hardware required to report this information. Rather than tracking individual vehicle movements – often cited as the chief privacy concern and main objection to road pricing – this energy consumption information could be used in place of the charger-derived data described earlier.

The Government claims that declining vehicle tax revenues are a global problem. This suggests there would be considerable international support for developing the protocols necessary to enable this.

While charger-derived reporting is clearly the simpler solution, both methods would enable the levying of a per kWh road duty on EVs without the need for any additional infrastructure.

What might an EV Duty look like?

Road fuel duty raised nearly £25bn for the Treasury in 2022. Any replacement mechanism must be able to generate similar receipts even if the country was to achieve 100% EV adoption.

In considering a simple flat rate for EVs that mirrors the principle of RFD, first we need to understand the level of duty each category of road user currently pays to ensure no group is unfairly disadvantaged by any new system. Using pre-pandemic information from the Department for Transport's National Road Traffic Survey combined with petroleum delivery data, we can calculate fuel consumption figures for each vehicle class and, ultimately, estimate the amount of RFD they pay as a result.

	Cars	Motorcycles	LGVs	HGVs	Buses
Vehicle miles ³⁰ (billion)	278.2	3	55.5	17.4	2.4
Fuel use ³¹ (tonnes)	21.35	0.17	6.03	6.05	0.96
Litres (millions)	27,034	229	7,184	7,177	1,137
RFD ppl ³²	57.95p	57.95p	57.95p	57.95p	57.95p
RFD Receipts	£15,666m	£133m	£4,163m	£4,159m	£659m

We also need to establish equivalent energy consumption figures for electric vehicles. By looking at typical vehicles in each segment and using their WLTP-certified driving range and nominal battery capacity, their average energy use in miles per kWh can be calculated.

	Car	Motorcycle	LGV	HGV	Bus
Example	Renault Mégane E-Tech ³³	Zero SR/F ³⁴	Renault Kangoo E-Tech ³⁵	Mercedes eActros ³⁶	BYD ADL Enviro200EV ³⁷
Battery capacity kWh	60	15.2	45	336	348
Range miles	280	114	186	136	160
Miles per kWh	4.67	7.5	4.13	0.40	0.46

³⁰ DfT, National Road Traffic Survey, Road traffic (vehicle miles) by vehicle type, TRA0101

³¹ DfT, Petroleum consumption by transport mode and fuel type, ENV0101

³² Pence per litre from 24 March 2024

³³ Renault Mégane E-Tech, www.renault.co.uk/electric-vehicles/megane-electric.html

³⁴ Zero Motorcycles, SR/F Specifications, www.zeromotorcycles.com/en-gb/model/zero-srf

³⁵ Renault Kangoo E-Tech, business.renault.co.uk/electric-vehicle-range/kangoo-van-etech-electric.html

³⁶ Mercedes-Benz Trucks, eActros Technical Data, www.mercedes-benz-trucks.com/en_GB/emobility/world/our-offer/eactros-and-services.html

³⁷ BYD ADL, Enviro200EV Fact sheet, www.evbus.co.uk/wp-content/uploads/2021/03/BYD-ADL-Enviro200EV.pdf

Armed with this information, we can calculate how much energy each vehicle class will need if it is to maintain today's traffic levels post-electrification. This also shows us that in a fully-electric future, the UK will need to secure more than 121 terawatt-hours of additional energy annually to supply the road transport sector alone – more than a third of our entire generation capability of 333 TWh³⁸. That would require building more than 15 new nuclear powerplants of equivalent capacity to Sizewell B³⁹.

To match the level of revenue raised by RFD, electric vehicles would need to be subject to a duty of just 20p per kWh. However, that places an undue level of burden on HGVs and the road haulage sector, which would find itself paying an additional £4.5bn a year in duty.

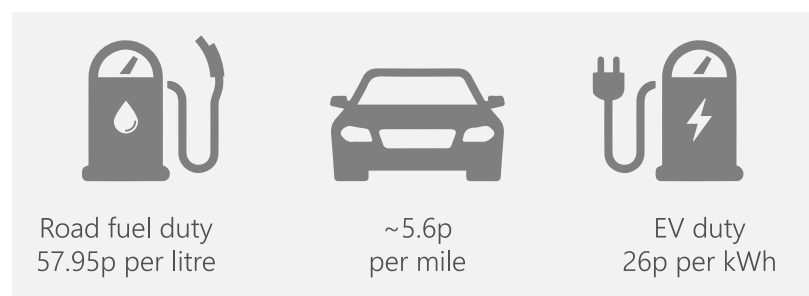
	Cars	Motorcycles	LGVs	HGVs	Buses
Vehicle miles (billion)	278.2	3	55.5	17.4	2.4
Total kWh	59,614m	400m	13,427m	42,988m	5,220m
EV Duty rate p/kWh	20p	20p	20p	20p	20p
EVD Receipts	£11,923m	£80m	£2,685m	£8,598m	£1,044m
Total EVD	£24.3bn				

To balance this, it may be considered fairer to charge cars, motorcycles and vans a higher rate of 26p per kWh, broadly equalling each group's current RFD contributions, while HGVs and buses pay a lower rate of 10p and 12.5p per kWh respectively.

	Cars	Motorcycles	LGVs	HGVs	Buses
EV Duty rate p/kWh	26p	26p	26p	10p	12.5p
EVD Receipts	£15,500m	£104m	£3,491m	£4,299m	£653m
Total EVD	£24bn				

That would also achieve price parity for EVs with their ICE equivalents on a tax-per-mile basis. Petrol cars taxed at 57.95p per litre pay RFD at a rate roughly equivalent to around 5.6p per mile. At 26p per kWh, that rate is almost matched by EVs.

ICE		EVs	
Road fuel duty (pence per litre)	57.95p	EV duty (pence per kWh)	26p
Average mpg	46.8	Average miles per kWh	4.67
Tax per mile	£0.0563	Tax per mile	£0.0557



³⁸ Department for Business, Energy & Industrial Strategy, DUKES 2022

³⁹ EDF, Life cycle assessment of electricity from Sizewell B nuclear power plant development, www.edfenergy.com/sites/default/files/life_cycle_assessment_of_electricity_from_sizewell_b_nuclear_power_plant_development.pdf



Conclusion.

Road pricing isn't the only show in town

As we've seen, the Government could afford to revise Vehicle Excise Duty to use simpler, fairer flat rates that sweep away years of orphaned policies, without jeopardising the current level of revenue. Today that stands at around £7bn pa.

We've also seen how a new EV Duty could be created to sit alongside the existing Road Fuel Duty. Both could operate in parallel during the transition from internal combustion to electrified transport. Even if the UK's transport sector was to achieve 100% electrification, such a duty would continue to generate revenue at a level similar to the £25bn pa currently raised by RFD.

The challenges involved in deploying such a duty are easily surmountable. Indeed, existing legislation has laid the groundwork by ensuring the infrastructure required to implement it is already being installed. This does away with the need for the large-scale installation of black box-style telematics devices and, as existing schemes have shown us, any system based on tracking individual vehicle movements is likely to be very expensive to administer.

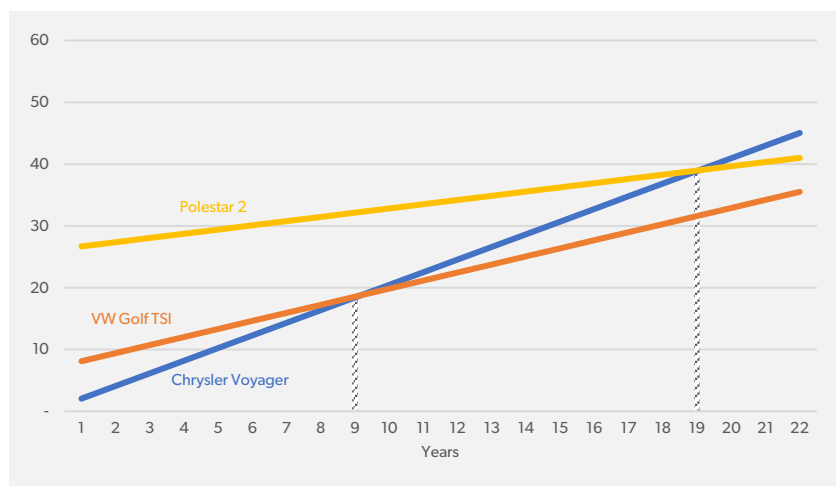
Although any new duty is unlikely to be welcomed by EV owners, recent moves by the Government have demonstrated that the existing framework of favourable tax rules for electrified vehicles cannot continue forever. That this problem has arisen now, as EV adoption is at its highest, should be a surprise to no-one.

But that doesn't mean any response to this conundrum should be unfair. Our proposed EV Duty rates would see electric cars taxed identically per mile to petrol and diesel-powered vehicles.

Ultimately, this is just one proposal, and there are many other ways this problem could be tackled. Hopefully, however, it has been shown that nationwide road pricing is not the only show in town.

Appendices.

1. New vs. Old comparison



	Chrysler Voyager	VW Golf TSI ⁴⁰	Polestar 2 ⁴¹
Total lifetime CO ₂ (tonnes)		37.4	42
Production CO ₂ footprint (tonnes) (A)	0*	6.8	26
In-use CO ₂ footprint (tonnes)		30.6	16
In-use CO ₂ footprint p.a. (tonnes) (B)	2.05**	1.31	0.68
Break-even (years)***		9.2	19.1
Total CO ₂ footprint at break-even (tonnes)		18.81	39.03

* No production assessment, as vehicle already exists.

** 240 g/km over 5,300 miles = 2.05 tonnes of CO₂.

*** The point at which A + (B * years) falls below the compound in-use emissions of the Chrysler Voyager. The manufacturer's lifecycle assessment is based on 200,000km. At the UK's average of 5,300 miles p.a., this would suggest a lifetime of 23.4 years. However, it is likely the Polestar 2's batteries would become unserviceable before this duration is reached, meaning break-even may never be achieved.

2. VED exemption for historic vehicles

	Cars	Motorcycles	LGVs	HGV	Buses	Other	Total
Licensed vehicles built prior to 1982 ⁴²	331,074	240,416	91,236	4,958	4,738	199,969	872,391
VED rate	£180	£111	£320	£350	£330	£180	
Revenue	£59.6m	£26.7m	£29.2m	£1.7m	£1.6m	£36.0m	£154.8m

3. Reduced VED for small capacity powered two wheelers

	125cc or less	Over 125cc	Total
Number of Motorcycles	367,557 ⁴³	1,082,042	1,449,599 ⁴⁴
VED Rate	£25	£111	
Revenue	£9.2m	£120.1m	£129.3m
Cost of measure			£25.7m

⁴⁰ Volkswagen Sustainability Report, 2020, www.volkswagenag.com/presence/nachhaltigkeit/documents/sustainability-report/2020/Nonfinancial_Report_2020_e.pdf

⁴¹ Polestar 2 Lifecycle Assessment, www.polestar.com/dato-assets/11286/1600176185-20200915polestarlcafinala.pdf

⁴² DfT, Vehicles at the end of the quarter by licence status, body type, make, generic model, model, year of first use and year of manufacture, df_VEH0124

⁴³ DfT, Vehicles at the end of the quarter by licence status, body type, make, generic model, model, fuel type and engine size, df_VEH0220

⁴⁴ DfT, Licensed vehicles at the end of the quarter by body type, VEH0101



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