

Delivering the phase out of cars with engines

Evidence to Transport Select Committee

February 2021

Summary

Transport and Environment welcomes the opportunity to provide evidence to the Transport Select Committee inquiry into zero emission vehicles and road pricing. Our evidence shows ending the sale of new conventional cars and vans by 2030, and hybrids by 2035, is entirely feasible but to do so the government needs to develop and implement a new delivery plan.

With sales of zero emission vehicles now over 5% of new car sales and one public charger for every 4.5 battery electric cars on the road, the role of government and the policies it pursues must evolve. Specifically, the government no longer needs to drive innovation. Instead it should ensure the market delivers all of the required elements for the switch to a fully electrified fleet. A clear roadmap for the evolution of policy required is needed. This includes; phasing out some long running grants that support electric car purchases and charger installation; introducing new regulations and planning guidance; evolving vehicle and other tax policies to incentivise the uptake of battery electric cars and chargers; and allocating new responsibilities and resources for local authorities to manage the rollout of local charging. Specifically the delivery plan should include:

1. Reformed incentives for the purchase of ZEVs, including phasing out the increasingly unaffordable Plug-in Car Grant and replacing it with a bonus-malus style tax in which tax breaks for BEVs are paid for by higher registration taxes on high CO2 emission cars. Commitments to low rates of company car taxes for ZEVs until at least 2025 should be made.

2. A ZEV sales target (that will ensure a strong supply of BEVs to the UK) on carmakers of around 17% in 2024, rising in steps to 100% of sales by 2035, with penalties for noncompliance.
3. Levelling up the availability, ease of access and reliability of charging infrastructure in the UK, such that by 2025 there is good coverage in every UK district. From 2025, new regulations and planning guidance should also be implemented to require an increasing proportion of all car parking spaces (whether in residential locations, workplaces or private car parks) to install charging points. This should be supported with an improved system of Enhanced Capital Allowances to offset some costs.

With regard to hybrid cars, we propose only plug-in hybrid models that meet strict criteria to ensure these are driven overwhelmingly in electric mode can be sold after 2030. The phase out of diesel trucks should commence soon, to ensure that by 2035 all new urban and regional delivery trucks and vans are electric, and that by 2040 the UK has sold its last long-haul diesel truck.

1. This submission

This submission summarises Transport and Environment (T&E's) views of the questions posed in the call for evidence of the Transport Select Committee - *Zero emission vehicles and road pricing*.

T&E is Europe's foremost sustainable transport think tank and environmental group. It is a federation of almost 60 national organisations across Europe and the UK campaigning for greener transport. T&E has a team based in the UK working to accelerate the shift to zero emission vehicles (ZEVs) and has undertaken extensive research on how to deliver the transition to ZEVs, including in the UK, much of which is referenced in this submission. Our work has informed and influenced key European Union and national policies including EU car and van CO2 regulations that have driven carmakers to begin manufacturing and selling electric vehicles in much greater numbers. We regularly brief the Office of Zero Emission Vehicles, Climate Change Committee, MPs and other key stakeholders on the steps needed to accelerate the shift to ZEVs.

T&E is delighted that the Transport Select Committee has decided to examine zero emission vehicles and road pricing and this briefing responds to the call for evidence addressing:

- The need for policy to evolve as the market for EVs grows
- The key components of the ICE phase out delivery plan
- The role of PHEVs

- Vans & Trucks
- Road user charging

2. The 2030/5 phase out dates are feasible - but policy must evolve to deliver the goals

The evidence and expertise T&E has acquired leads us to believe that ending the sale of new conventional cars by 2030, and hybrids by 2035, is entirely feasible. Indeed, a slightly earlier 2032 date proposed by the Climate Change Committee is also possible. Both dates are likely to stimulate the development of cell and electric car manufacturing in the UK as carmakers scale up production of electric versions for the European, including UK, market. However, to achieve the goal will require a significant shift in government policy and the creation and execution of a delivery plan that is not yet in place.

Both this and previous governments have made significant efforts and provided substantial funding to support the shift to ZEVs, including purchase grants for electric cars and charging infrastructure. Government has also rolled over EU car CO2 regulations, so these have continued to apply in the UK since we left the EU. After a decade of significant investment more than [one in 10](#) new cars sold in 2020 were electric, including 6.9% battery electric (BEVs) and 4.3% plug-in hybrids (PHEVs). This equalled annual growth of 140%. Sales in 2021 are expected to exceed 12% to meet new UK car CO2 regulations. The UK currently has one charge point for every 4.5 BEVs on the road - a high ratio of cars to chargers although coverage across the UK is highly variable and accessing chargers needs to be made far simpler.

As sales and use of electric cars grows, the role of government must evolve from driving innovation through supporting early adopters and investors to managing the transition to ensure all of the required elements for the switch to EVs are in place. Growing the EV market from 1 to 5% required a very different suite of policies to growing the market from 10 to 25%, which is needed by 2025 if the UK is to achieve its phase out goals for cars with engines. Accelerating new car sales to ensure 100% of new car sales are ZEVs in the decade from 2025 to 2035 poses yet another set of challenges. T&E is concerned that the government, through its Office for Zero Emission Vehicles (OZEV), has not yet developed a clear roadmap for the evolution of policy required. This must include phasing out some long running programmes of support, introducing new regulations and some new tax breaks and new responsibilities for local authorities.

3. Key elements of a delivery plan to phase out cars and vans with engines

There are three key elements of the ICE delivery plan:

1. Strong supply of BEVs - this requires effective regulation of carmakers
2. Effective suite of incentives to buy BEVs - in the form of tax breaks
3. Establishing a comprehensive charging infrastructure that is simple to access and reliable to use.

Incentivising sales of ZEVs requires reform of car taxation and grants

A combination of regulations and tax breaks to encourage the supply and sale of BEVs and installation of charge points is needed to drive the transition and will be much more affordable for the public-purse than bankrolling the transition. Grants are a useful policy to encourage the early adopter market and reduce the risk for the first investors, but as the market grows they are and will become increasingly unaffordable. For example, the cost of plug-in grants (PICG) for electric cars will approach £1Bn in 2021. However, if grants are removed without appropriate tax breaks in place that adequately incentivise sales there is a high risk the market will stall. The Treasury should therefore align reform of car taxation to increase the incentives for choosing a ZEV, with a series of £1000 steps that reduce the value of the PICG and eventually phase it out.

It is expected that BEVs will begin to reach price parity with equivalent conventional vehicles in premium market segments around [2024](#) but it will be later in the 2020's before parity is reached in all market segments (including family cars). To bridge between supporting the market now and the point when BEVs are cheaper to buy in all segments, a bonus-malus form of taxation should be introduced. The scheme favoured by T&E would enable ZEVs to continue to receive a reduced PICG over the next few years that would be funded through higher 1st year VED taxes on conventional cars. Such registration taxes would increase the incentive to shift to a ZEV. This would send a clear message to car buyers that if they choose a zero emission car the Government will help them buy the vehicle, but buying more polluting cars will mean having to pay more tax. Such simple messages can incentivise and nudge new car buyers more effectively than the current arrangements.

The scheme is modelled on the French Bonus-Malus tax that has successfully operated since 2008. T&E has [estimated](#) the costs and revenues of such a tax scheme which we calculated would generate higher revenues than the current 1st Year VED. The charges are not so high that the taxes would significantly lower overall sales of new cars. This type of approach is very flexible,

enabling taxes on cars with engines to be progressively increased in time to dissuade more reluctant new car buyers to switch to electric before 2035. Additional revenues earned through the higher 1st Year VED rates could also be used to support both the rollout of charging infrastructure and electricity grid upgrades.

A similar approach of more steeply graduated VED taxes depending on the CO2 emissions of vans should also be introduced. The government [reported](#) on the responses to its consultation on reform to VED in 2018 but last year [announced](#) it would not be going ahead with the new graduated VED rates. This decision was extremely shortsighted, as progress decarbonising vans lags significantly behind those of cars.

One area of car taxation policy that is successfully driving the market is the low company car tax rates: the zero rate for ZEVs in 2019-20 and very low rates in 2020-21 (1%) and 2021-22 (2%) have created a huge incentive for company car drivers to switch to zero emission vehicles. However, T&E is concerned that the low rates for PHEVs (1 - 13% in 2021-22 depending on range) are encouraging too many company car drivers to choose PHEVs when [data shows](#) that these drivers are only using their electric motor for around 20% of the time. A subsequent section of this submission addresses the issues with PHEVs, but the clear evidence is that Benefit in Kind (BIK) rates for company PHEVs should rise: many company car drivers are benefiting from low taxation levels despite emitting high levels of greenhouse gases from their vehicles.

Regulation of car sales is essential to maintain strong supply

Incentives alone will not be sufficient to achieve a phase out of cars with engines by 2030/5. To deliver the required change, there must be an adequate supply of vehicles. This means auto-makers must be required to sell an increasing share of ZEVs. A regulation in the form of a ZEV Sales target is proposed: a system that successfully operates in California and many other US States.

There is overwhelming [evidence](#) that without EU car CO2 regulations, the auto-industry would not have increased the supply of electric cars to enable sales to exceed 10% in 2020. Tighter EU new car CO2 emissions (averaging 95g CO2/Km) came into force in 2020. Most carmakers chose to meet these targets - and avoid expensive penalties - by significantly increasing sales of BEVs and PHEVs. As a result, on average EU carmakers reduced CO₂ emissions from new cars by 9% in just 6 months in the first half of 2020 - the largest drop ever recorded (this followed a trend of increasing emissions from new cars since 2016). The tighter regulation also coincided with a large number of new model launches and increases in production.

Conversely, it is notable that there has been no significant increase in electric van supply. In 2020, UK sales of electric vans were just 1.7%. The van CO2 target is much less stringent than the equivalent car CO2 regulation (the target of 148gCO2/km would need to be [115gCO2/km](#) if it was of equivalent stringency to the car CO2 target). As a result, van makers have not needed to increase electric van supplies to meet van CO2 targets. This has led to widespread reports of supply shortages. In the absence of regulation, with penalties, car and van-makers have much less incentive to increase EV models and production. A shortage of supply will increase prices and the incentives made available by the government will not drive higher demand and uptake but principally deliver higher margins. Regulation to drive supply of EVs and tax breaks are complementary policies.

The government recognised the risk that EV supplies would dry up when the UK left the EU car CO2 regulations, and rushed through a new [UK car CO2 regulation](#) to apply from 1st January 2021. Had it not done so automakers would have prioritised supplies of EVs to the EU, to avoid penalties in the EU regulation. This would probably have meant that high emission models would have been 'dumped' in the UK. The UK regulation is [20% weaker](#) than the EU equivalent, despite Ministers claiming it was equivalent, but it has ensured the UK will continue to receive a good supply of BEV cars. The regulation also sets CO2 targets for 2025 and 2030, but these are far too weak to achieve the government's phase out targets. A [smooth trajectory](#) to achieve 100% ZEVs by 2035 requires sales of about a quarter BEVs in 2025, and two-thirds in 2030. However, the UK regulation will deliver less than half these levels of sales needed to meet the required goals. The new UK regulation therefore needs to be replaced and T&E, along with several other UK environmental groups, have proposed a [ZEV sales target](#) approach.

T&E has proposed that the sales target would commence in 2024 with a target of 17% BEVs, and then rise every 3 years to 40% (2027), 69% (2030) and 88% (2033). Penalties would be equivalent to those in the UK regulation (£100 for each 1% the sales target is missed for each vehicle sold). Companies would be free to trade credits with one another and brands with a market share below 0.5% would be exempted until 2030. The regulation would effectively put into law the 2035 date to end all sales of cars and vans with engines. PHEVs that meet the criteria to be sold after 2030 could count partially towards the sales target.

Coverage of charging points must be levelled-up by 2025 and grow strong afterward

T&E has undertaken a detailed investigation into charging in the UK and has concluded much of the criticism of the lack of public charging infrastructure is ill informed. At present there is one charge point for every 4.5 electric cars on the road today: a high ratio of EVs to chargers. Just [1%](#) of EV drivers wanted to go back to a combustion engine car.

The perception the UK needs a charging point attached to every street lamp is wrong. Approaching two-thirds of UK homes have off street parking and this means that cars housed in these homes will be predominantly charged here. Half of all drivers use their car for less than 135 miles a week, and will therefore typically only need to charge their car twice a month. These EVs could also make use of chargers located at their destination (for instance, workplace chargers) and rapid chargers on longer trips. Just 4% of cars are driven for 350 miles a week or more, and need access to the public charging network every few days. Tackling the poor perception of the UK charging network requires addressing weaknesses with the current system: by improving the coverage, reliability and ease of use of the network and creating the conditions to allow the network to grow with the number of BEVs.

The UK already has nearly 8000 slow chargers, with some located at kerbside locations. It also has nearly 21,000 public fast chargers in car parks, and will shortly reach 10,000 chargers with an output over 25KW/h (including over 1300 Rapid chargers with an output of over 100KW/h). The number of charge points needed in the future depends on the balance of different charger types. Slow chargers located at kerbside sites close to people's homes or at workplaces are only likely to deliver sufficient charge for one or two cars to fully charge a day. Fast chargers at destination car parks are likely to charge around four to six cars a day depending on the utilisation of the charger. Rapid chargers at urban hubs and located at sites along the road network can charge a car in much less than an hour. Forthcoming T&E analysis shows that the UK already has nearly enough chargers overall to accommodate the expected growth in EVs to 2025. However, the current charging network is not distributed evenly. Until 2025, the focus of policy should be on levelling up the charging network to achieve a good level of coverage in all local authority areas. After 2025, there will need to be a rapid increase in charge points as the number of EVs on the road grows quickly, and for this reform of planning guidance will be needed.

As well as ensuring a good coverage of charge points throughout the UK, to create a world class charging network the role of government must change from one of stimulating innovation and providing investment to an enabler of an extensive, high quality network. The need for a green

recovery from the pandemic and the huge benefits of transport electrification justify continuing public investment. However, it is unrealistic and unnecessary for the government to bankroll the installation of the charging network. Government support for the transition should move away from increasingly expensive grants and capital funding for chargers towards providing tax breaks for companies installing charge points and funding Charging Officers in local authorities to deliver the roll out of additional charge points.

Regulations and reform of buildings regulations should be used to increase the supply of charge points, particularly after 2025. The government also has a crucial role to play in reducing the prohibitively high costs to businesses that wish to install chargers, but don't as a local grid upgrade would be needed. The government therefore needs to use funding for this purpose in the immediate future, whilst it develops a long term solution. Additionally, at present there is no requirement for property developers to install home charging for new build properties, even where off street parking is provided. The UK Government [consulted](#) on reform of the English Building Regulations in 2019 and proposed that:

- Every new residential building (and building undergoing material change of use) with an associated car parking space should have a charge point installed.
- Every residential building undergoing major renovation with more than 10 car parking spaces shall have cable routes for electric vehicle charge points in every car parking space.
- For new non-residential buildings (including those undergoing major refurbishment) - with more than 10 car parking spaces to have one charge point and cable routes for an electric vehicle chargepoint for one in five spaces.
- For existing non-residential buildings - there shall be a requirement for at least one chargepoint where there are 20 car parking spaces, from 2025.

So far though, the Government has not brought forward any changes despite bringing forward the phase out date for cars and vans with engines from 2040 to 2030. Government needs to make decisions and strengthen its original proposals, including requiring that developers install cabling irrespective of the number of car parking spaces.

Existing government schemes including the: Electric Vehicle Homecharge Scheme; Workplace Charging Scheme; and Ultra Low Emission Taxi Infrastructure Scheme should be phased out once regulations requiring charge points to be installed in car parks are introduced. The Government has just announced an extension of the Electric Vehicle Homecharge Scheme to small business, leaseholders and those in rented accommodation. This is a positive development in the short term, as the amounts of public investment are relatively small. However, reform of planning laws to require a proportion of all car parking spaces to be fitted with a charge point will be essential

from 2025 to scale up the level of charge points needed. Strengthening the system of enhanced capital allowances to allow all the costs of charger installation to be offset through tax breaks would help developers meet the additional costs.

The On-street Residential Chargepoint Scheme should be reformed to adopt a “contract for difference” approach, with the aim that this support can also be phased out. To be fair to less affluent drivers without off street parking, the cost for charging at public sites should be reduced by levying a 5% VAT rate, to match that for domestic household electricity customers. Specifically the Government, through the Office of Zero Emission Vehicles should take steps to improve the operation of the UK charging network by:

1. Establishing a statutory responsibility on local authorities to provide a right to charge for EV owners to ensure there is an adequate supply of local charge points and to fund and support local authority posts to deliver the new requirement.
2. Regulating charge point operators to: ensure every EV charging point is accessible to all BEVs; streamline the process by which EV drivers access the charging network; require all public available charge points to be registered on a dynamic, publicly available national charge point registry; mandate minimum levels of maintenance and repair, and customer support; and that there is transparent pricing.
3. Developing a strategic solution to the high cost of grid connections for chargepoint operators and other private businesses. In the short term the [Rapid Charging Fund](#) should be directed exclusively at offsetting high grid connection costs.

4. Only Plug-in Hybrid Electric Cars (PHEVs) meeting strict criteria should be sold after 2030

There is considerable debate about the merits and future role of PHEVs, and the Government is shortly due to consult on which hybrid cars should be sold after 2030. There is now overwhelming [evidence](#) the average emissions from PHEVs are only marginally less than those of conventional hybrids, and significantly higher than an equivalent BEV. [T&E analysis](#) of databases of real world emissions from PHEVs shows that rather than emitting an average of 44 g CO₂ per kilometer (as measured using official, and flawed, laboratory tests) most PHEVs are actually emitting over two and a half times this level of CO₂ emissions when driven on the road. On average, PHEVs emit 117g CO₂/km on the road: only slightly better than the emissions from a conventional hybrid car like a Toyota Prius (135g CO₂/km). A conventional new ICE car has emissions of 164-167g CO₂/km on the road (diesel and petrol respectively).

PHEVs are widely bought as company cars, but their usage pattern is highly unsuited to the longer journeys typically undertaken by owners of company cars (since the car will not be driven using electrical power for a high proportion of the time). [T&E tests](#) conducted on three PHEVs show that, when driven in engine-only mode, emissions from all the cars were over 150g/km - up to eight times higher than 'official' values. A study by the [ICCT](#) showed company car driver emissions are typically 3-4 times higher on the road than official test values. If PHEVs are to receive lower rates of company car taxation, the owner should be required to demonstrate the car is being driven for a high proportion of the miles driven using the battery.

Over the lifetime of the vehicle a new PHEV in 2020 will emit about 28 tonnes of CO₂, slightly less than a conventional hybrid car (33 tonnes). In comparison a conventional petrol or diesel car emits 39 and 41 tonnes respectively. A new battery electric car will emit about 3.8 tonnes from the electricity it uses. PHEVs should not be considered electric vehicles, but more efficient conventional cars. Beyond 2030, no hybrid cars should be sold in the UK. Only PHEVs that meet strict criteria to ensure they can be driven in electric mode for the vast majority of their trips should be allowed to be sold. The criteria proposed by T&E for PHEVs sold between 2030 and 2035 are that PHEVs shall have:

- A minimum equivalent all electric range of 75 miles (120k) measured on the WLTP test: this will ensure the PHEV can undertake a larger share of miles driven in electric mode.
- The capacity to fast charge (at faster than 50KW/h) thus enabling a PHEV to be recharged quickly 'en-route'.

- An electric motor with at least an equal power output as the accompanying ICE engine: in many PHEVs fast accelerations require the engine to kick in. A larger electric motor will prevent this.
- The ability to operate in ZEV mode in all conditions: many PHEVs switch on the engine when the car's heater or air conditioning units are switched on.

5. Decarbonising Trucks needs to begin now

To achieve the UK's net zero target, vehicles, including heavy-duty vehicles (HDVs), will need to be entirely decarbonised. A [T&E study](#) has identified a range of policies and technologies through which this can be achieved and shows that for urban and regional deliveries, battery electric trucks offer the best option to decarbonise. It also shows that battery electric trucks and those using an overhead catenary infrastructure are likely to be the most cost-effective pathway to decarbonise long-haul trucks by 2050, but that renewable hydrogen could also be an option.

Efficiency measures such as improved fuel efficiency of trucks, modal shift to rail and optimised logistics supply chains can contribute to reducing freight emissions. But they are not even sufficient to reach the UK's 2030 target, let alone fully decarbonise the UK's inland freight sector by 2050. Combining the efficiency measures would result in tank-to-wheel emission reductions of 29% by 2030, and 20% by 2050 (against 1990 levels). This is totally inadequate on its own to reach the UK's climate targets. It is therefore necessary to fully decarbonise the HGV fleet. This is technically feasible, but to complete the transition by 2050 a start must be made in the early 2020s. This should begin with a phase out of sales of new smaller diesel trucks (less than 26 tonnes) by 2035 and all diesel trucks by 2040. Even with these dates, a usage ban on the legacy diesel fleet will be needed from 2050.

Using electricity directly in trucks stored in batteries is the optimal way to decarbonise this sector as using renewable energy to produce hydrogen or synthetic fuels is much less efficient and will require substantial additional renewable generation. Direct use of electricity in trucks uses 77% of the original energy generated, compared to 33% for hydrogen fuel cell vehicles, and 23% for e-diesel driven vehicles. Forthcoming T&E analysis predicts that if direct electrification options (fast chargers or an electric road system) are pursued, heavy-duty trucks will require 4 TWh of renewable generation in 2030. If instead half of the zero emission trucks used hydrogen fuel cells, then 7 TWh would be required, necessitating an extra 0.6 GW of additional offshore wind capacity to be built by 2030. Zero emission trucks using e-diesel and hydrogen would require 12 TWh of renewable generation, that would require 1.8 GW of additional offshore wind capacity to be built

by 2030. By way of comparison the Hornsea 1 wind farm, the (current) largest in the world, has a capacity of 1.2 GW. Whilst it is feasible for renewable electricity to replace fossil fuels to power transport in the UK, it is important to use the most efficient energy carriers. Between 2030 and 2050 the growth in demand for renewable electricity using the most efficient options still leads to a 27-fold increase in renewable energy demand in transport over 20 years.

6. Road user charging has a key role to play in decarbonising transport

T&E UK welcomes that road pricing is part of the Committee inquiry. A shift to EVs will progressively reduce the £40 million of fuel and vehicle taxes annually paid by drivers. However, fuel sales and vehicle taxes will decline slowly, but will also be replaced by other revenues. The lower total costs of ownership of electric cars will enable citizens to buy other goods and services earning the Treasury higher VAT returns. A recent study for [Greenpeace](#) forecasts increases in employment and higher levels of economic activity arising from the 2030 ban on new ICE sales. This would generate a £1.9 billion net increase in revenues by 2030.

Public support for road pricing has improved: a recent [survey](#) found that nearly two-thirds of people across the UK now support schemes to charge road users a fee to drive in towns and cities.

Road pricing can make an important contribution to meeting the UK's climate goals by helping to reduce vehicle miles driven. It would also generate wider societal benefits for health, pollution and the economy by lowering congestion. [24% of car journeys are under two miles](#) and, if drivers were charged for the trip, some would choose a more sustainable option. However, a number of questions need to be resolved in order to balance different scheme objectives, including ensuring it is equitable and privacy issues are accounted for.

T&E consider that whilst a road pricing scheme for cars is desirable, it should be applied to trucks and vans first. Distance-based road charging for trucks is widely used [across Europe](#) including in France, Germany, Spain, Italy and Poland. However, the UK has to date only levied charges on foreign trucks using UK roads to support the haulage industry. Fees for UK trucks have been offset against a reduction in vehicle excise duty, illustrating how road pricing can shift as well as increase or decrease overall tax take. Fees in the UK's time based truck charging scheme are differentiated by: the weight of the vehicle (charging for damage to the road); the Euro class (charging for the emissions of the vehicle) and the length of time the truck spends in the UK - but not the distance driven. A recent [study](#) by

Transport & Environment (T&E) highlighted the importance of levying distance-based tolls for diesel trucks as a means to kick start the market for zero-emission trucks. A road pricing scheme with lower charges for electric trucks would similarly incentivise sales.

While distance-based truck charging provides a large-scale test-bed, the benefits of road pricing are far greater when applied to cars. A [paper by T&E](#) outlines some of our key objectives of road pricing schemes, including to reduce vehicle use, encourage modal shift in urban areas, and promote sales and use of zero-emission vehicles.

Further information

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