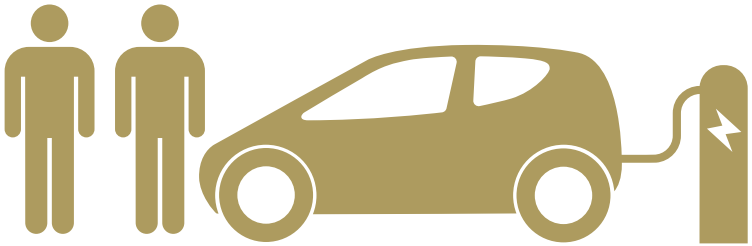
Going electric

How everyone can benefit sooner

green alliance...



Summary

By 2021, new plug-in vehicle sales are expected to rise to 200,000 annually, up from 2,300 registered plug-in cars in 2012. Globally, the automotive industry plans to spend £300 billion over the next five to ten years to drive down the cost of electric vehicles (EVs), supported by public policy which is actively encouraging consumers to buy them.[1]

This is good news for people buying new cars as well as for the climate. New EVs have much lower running costs than conventional cars, making them cheaper on a total cost of ownership basis than new petrol and diesel cars.

There is a risk, though, that low income households will be left behind in this transition, stuck using vehicles that are polluting and expensive to run. Households in the bottom 40 per cent of the income range mostly buy second hand cars.

Low income households are disadvantaged by this in a number of important ways. They are disproportionately burdened by maintenance and repair costs as they own older conventional vehicles. Repairs to older diesels can cost up to £2,000, or roughly 15 per cent of the total cost of the car, contributing to financial insecurity for those already on tight budgets. EVs are cheaper to maintain and, because they are more durable and have fewer moving parts, maintenance costs are more easy to plan for.

Those on lower incomes are also most affected by traffic related air pollution, despite contributing least to its cause.[2] EVs are an important part of the solution in tackling local air quality and improving the lives of the least well off.

Our study, based on analysis by Element Energy, shows that low income households could save £3,000-£5,000 per car if they were to buy or lease a used EV, compared to the cheapest diesel vehicle, on a total cost of ownership basis.

This is because EVs are very cheap to run, and new car buyers are paying the largest share of

the high upfront cost of a vehicle. For the third owner, an EV cuts the total cost of motoring by over 30 per cent compared to a petrol car.

Of the ten million cars that were bought in the UK last year, eight million were second hand vehicles. Despite EV registrations growing nearly twenty-five fold in six years, only 2.5 per cent of new sales and 2.3 per cent of second hand sales in 2018 were electric.

The only way used EVs will be made more available sooner to lower income households is by boosting sales of new EVs to ensure a ready supply of second hand models. In particular, more EV purchasing by fleet buyers should be encouraged, because fleet vehicles are typically sold on after three years and sometimes sooner.

Slow adoption, as the UK proposes with its 2040 new petrol and diesel vehicle sales ban, is restricting the growth of the EV market in the UK.

To ensure that those on lower incomes can benefit sooner from electric transport, we recommend that the government should:

end the sales of petrol and diesel vehicles by 2030, and introduce a zero emissions vehicle mandate on manufacturers, requiring a minimum proportion of their cumulative annual sales to be battery EVs;

extend the plug-in grant to 2025, when EVs will become the cheapest models;

support cost effective access to charging in workplaces, to increase consumer confidence to buy EVs;

encourage the uptake of electric vehicles by fleets by increasing vehicle excise duty for new petrol and diesel vehicles.

Cars dominate the way we travel

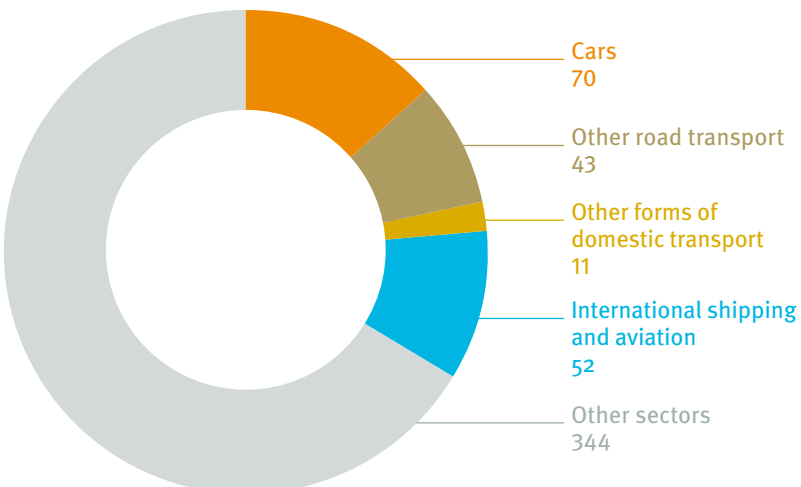
Over three quarters of all journeys made on UK roads are by car and this trend is not changing, new vehicle sales were 2.3 million in 2018.[3]

The transport sector is the largest source of UK carbon emissions, with cars alone responsible for 40 per cent of this. Cars and vans also contribute to more than a quarter of the UK's air pollution (NOx and particulate matter) and the World Health Organisation estimates this costs our economy £54 billion a year.[4]

Addressing these problems needs a dramatic overhaul of the national fleet, including the switch to electric vehicles (EVs). EVs, over their lifetime, are responsible for 50 per cent less emissions than a comparable diesel vehicle and this will improve further as carbon emissions from electricity generation continue to fall.

Cars are responsible for the majority of transport carbon emissions in the UK[5]

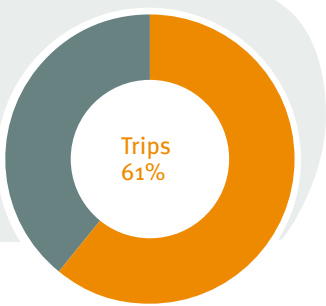
Sources of UK carbon emissions 2016 (in $MtCO_2e$)

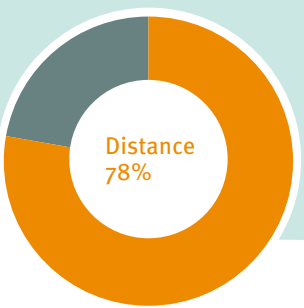


Cars are the main form of transport in England[6]

How we travelled in 2018

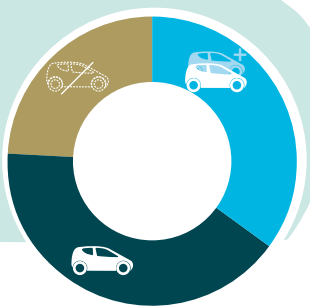
Car
Other modes of transport





Car ownership in 2018

76% of households owned at least one car



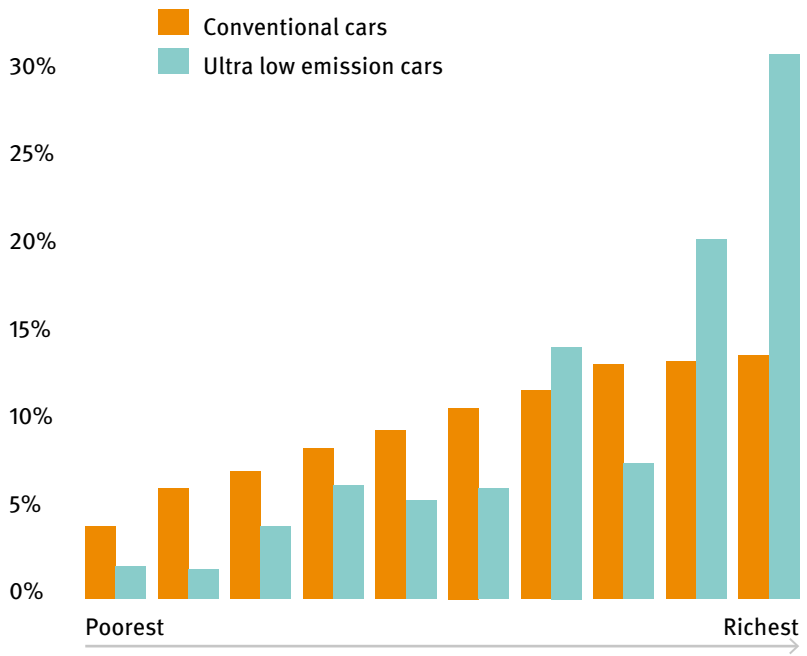
Wealthy households own most of the new electric vehicles

Those in the top 20 per cent income bracket in the UK own over half of the EVs sold while the bottom 20 per cent own only four per cent.[7]

Households in the bottom 20 per cent of the income range spend around ten per cent of their income running vehicles, compared to five per cent in the highest income group.

While over a fifth of low income households do not own a car, poor access to public transport forces many into car ownership.[8] For lower income households this can stretch already tight budgets and contribute to financial insecurity. With lower running costs, EVs have the potential to considerably reduce the cost of motoring for low income households.

Distribution of conventional versus ultra low emission cars owned, by income decile[9]



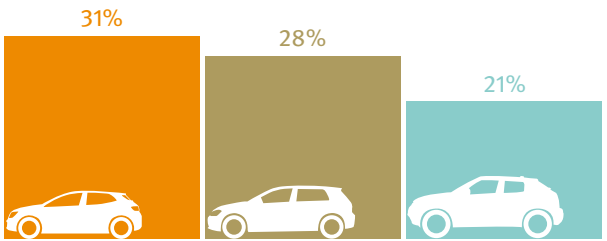
The cost of owning EVs is coming down

Upfront costs are high...

Over 70 per cent of new car registrations are in three categories: the supermini, the small family car and the urban crossover SUV. The price of the electric versions of these models is still significantly higher, even after the current plug-in vehicle grant is included.[10]

The cost of new vehicles

Proportion of 2018 registrations



	Supermini	Small family car	Crossover SUV
Petrol and diesel models	Ford Fiesta £16,000	VW Golf £22,000	Nissan Qashqai £23,000
Current electric models (including plug-in grant)	Renault Zoe £24,320	VW Golf E £27,600	KIA e-Niro £33,000
Estimated cost of new electric models in 2020 (including plug-in grant)	Vauxhall Corsa-E £26,000	Volkswagon ID3 £22,000	Hyundai Kona Electric £33,600

...but battery EVs are cheaper overall

Total cost of ownership is an estimate of the financing cost of the car (ie how much it costs per month to purchase) plus its running costs (ie the cost of fuel, insurance, tax, and maintenance). A critical component of this measure is depreciation, ie the difference in the value of the car between its original list price and its estimated value over time.

For a typical family car, the total cost of owning a new battery electric vehicle over four years is cheaper than all other comparable vehicles of that type. It is roughly £400 cheaper than a diesel version. This takes into account the current plug-in grant scheme which offers a rebate of up to £3,500 for buyers of battery EVs.

Fuel cost savings are significant. A battery EV could save up to £4,500 in fuel costs compared to a petrol engine vehicle and over £3,000 compared to a diesel engine vehicle, over four years.

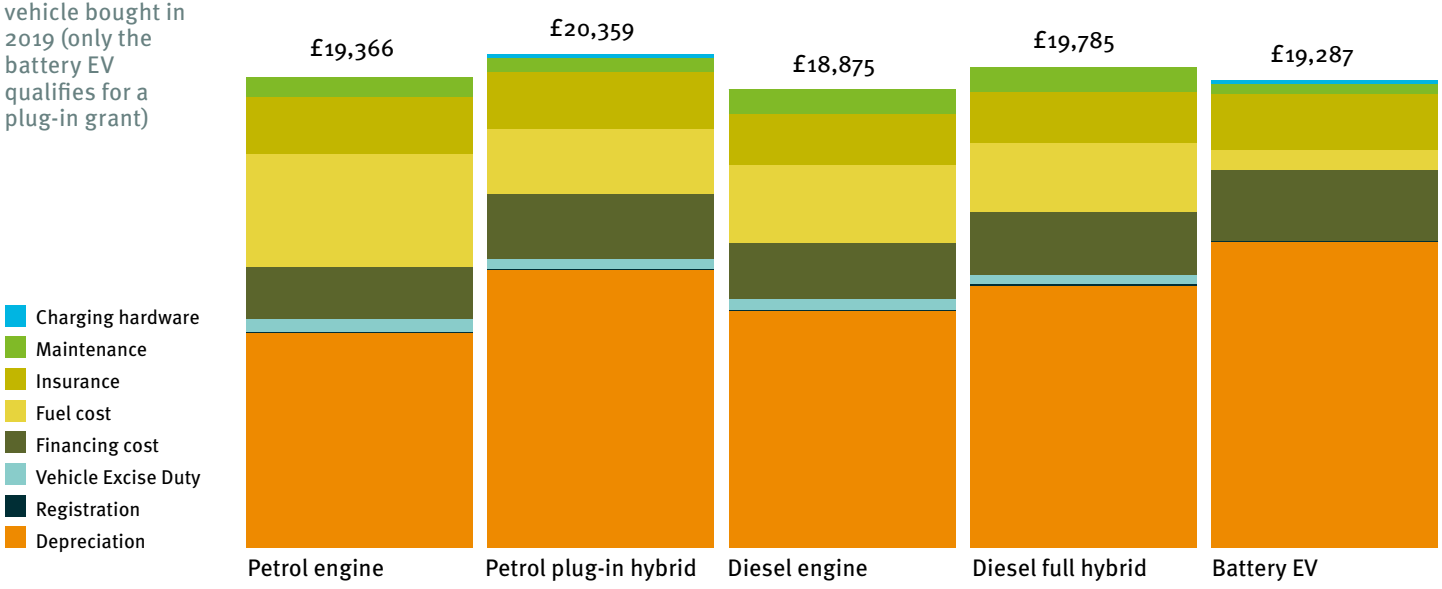
Plug-in hybrid vehicles are unable to compete with equivalent conventional non-hybrid vehicles on a total cost basis, largely due to the higher cost of depreciation caused by more expensive purchase prices, compounded by the fact that they do not qualify for the plug-in grant.

Small family cars: electric models are the cheapest to own

Total cost of ownership over four years of a new vehicle bought in 2019 (plug-in grant included)

Superminis: electric cars are cheaper than similar petrol models

Total cost of ownership over four years of a new vehicle bought in 2019 (only the battery EV qualifies for a plug-in grant)



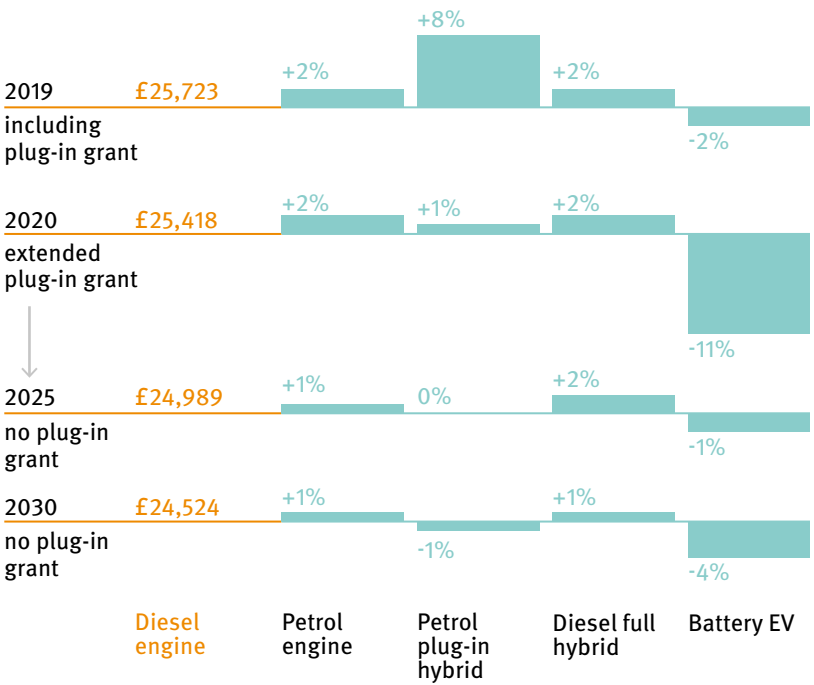
Crossover SUVs: electric versions are not yet cost competitive with most other models

Total cost of ownership over four years of a new vehicle bought in 2019 (only the battery EV qualifies for a plug-in grant)

All EV models will be the cheapest options by 2025

Reductions in battery prices are bringing the cost of EVs down. Battery powered vehicles are predicted to be cheaper than conventional cars in 2025 on a total cost of ownership basis, even after plug-in grants end. On the same basis, plug-in hybrid vehicles will also be the same cost as conventional diesel cars. And greater reductions in battery costs, as predicted by Bloomberg New Energy Finance, would see EV costs fall even further. Plug-in grants have driven down the overall cost of owning EVs and should be continued until cost parity with other models is reached.

Over the next five years battery EVs will be the cheapest small family vehicle to own, even after subsidies end



What will this mean for low income households?

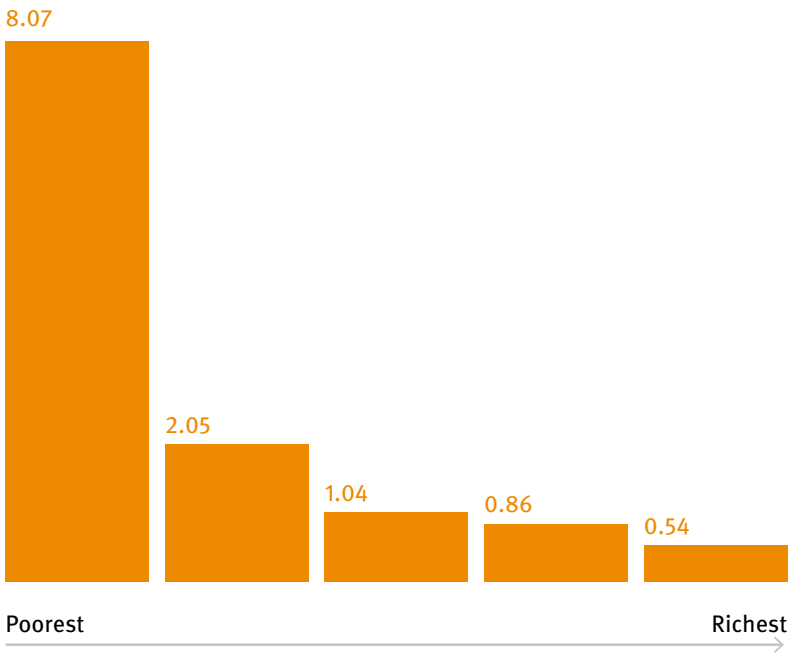
Car ownership is rising slowly for lower income groups.[11] Government figures show that low income households spend up to twice more on purchasing or loaning used cars than on new cars.[12]

Roughly eight million used vehicles are sold every year, four times more than new car purchases. Seventy five per cent of used cars bought by low income households are over five years old and less than ten per cent are under two years old.[13] Depreciation of EVs makes them an attractive second hand buy.

Low income households need better access to second hand EVs so they can benefit in the same way as wealthier households from the cost savings they offer. This would also dramatically reduce the carbon emissions and air pollution generated by cars across the country. A strong second hand EV market requires a much stronger market in new sales.

Those on lower incomes buy more used cars[14]

Ratio of used cars to car ownership across all income groups



Used EVs could save owners £3,000-£5,000

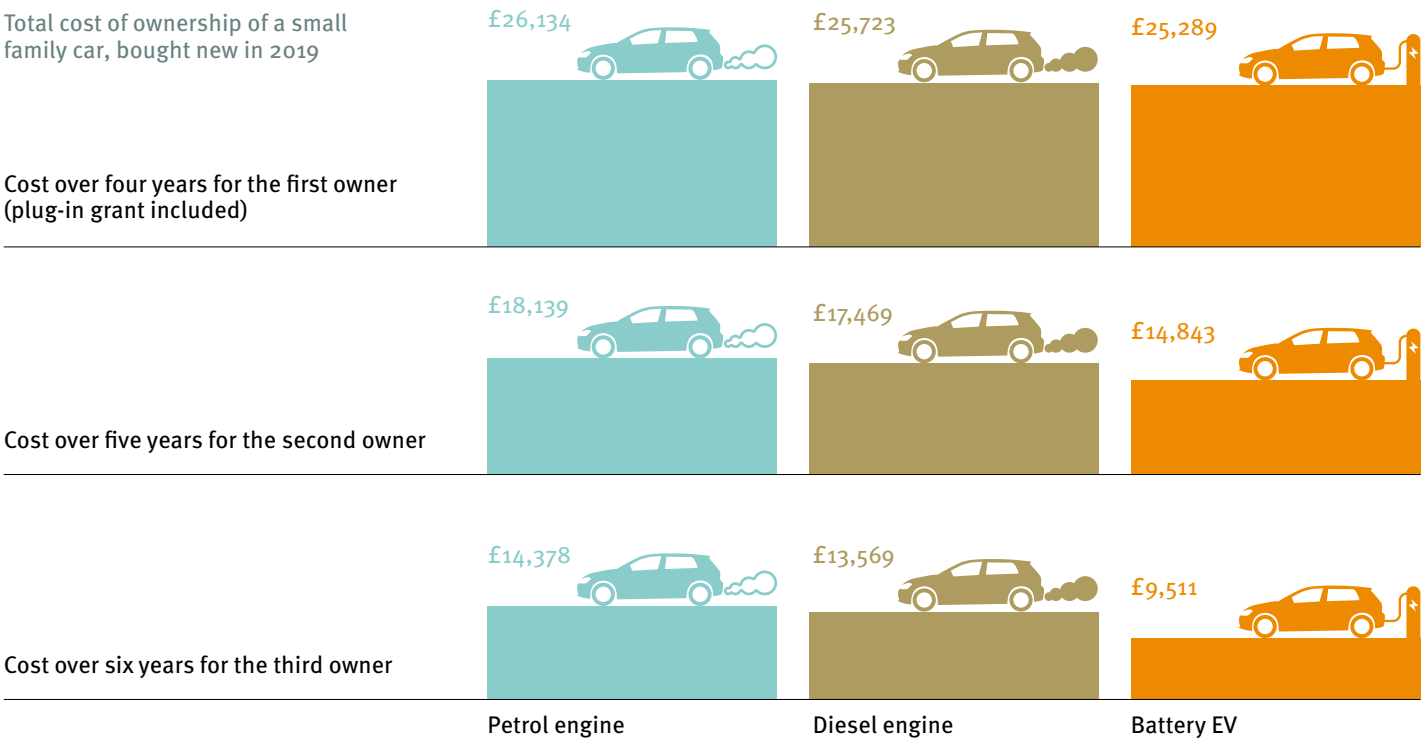
Lower total costs

Cars depreciate quickly. After the first four years, the upfront price of a car is significantly reduced. Most of the total cost for an owner buying a car of this age goes on running costs. For EVs, these costs are half that of conventional vehicles.

This leads to significant savings. The total cost of owning second hand EVs is roughly £2,600 to £3,200 less than equivalent diesel and petrol engine vehicles in the family vehicle category. The running costs of battery EVs over five years are almost half that of equivalent conventional petrol and diesel vehicles.

On the same basis, the cost difference is even clearer for the third owner of a small family vehicle. Over six years, they would save roughly £5,000 compared to an equivalent petrol vehicle, cutting the total cost of ownership by a third.

Total cost of ownership is much lower for a used electric small family car

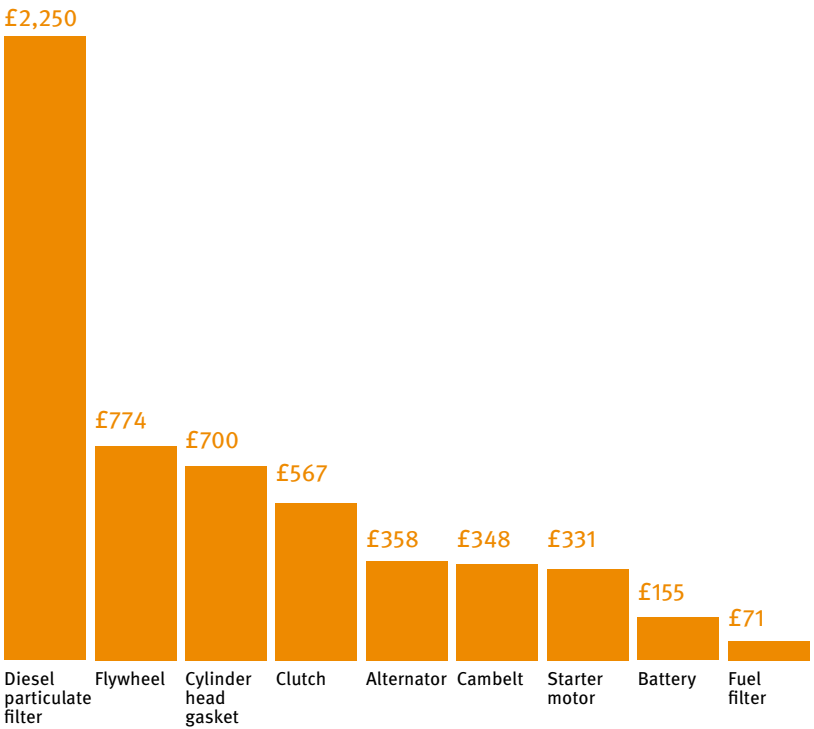


Lower maintenance costs

A household in the bottom 20 per cent of the income range spends around £300 a year on repairs and maintenance costs for petrol and diesel vehicles.[15] A shift to EVs could save them up to £170 annually as electric drivetrains have only around 20 moving parts compared to several hundred in a conventional vehicle.

For fleet operators, the savings could be as high as 70 per cent on service, maintenance and repair costs of petrol and diesel vehicles over a four year period.[16] For those on low incomes, expensive and unexpected repairs contribute to financial insecurity.

Typical replacement costs for diesel car parts



The second hand EV market has been slow to get going

The sale of EVs has grown steadily in the used car market since 2016, with the Nissan Leaf topping sales in its category.[17]

Fleet operators, which buy over half of the new vehicles sold each year, are major suppliers to the second hand car market. But less than three per cent of their purchases are electric, so the second hand EV market has been slow to get going.

Recent changes to benefit in kind tax rates has led to a surge in orders of fleet EVs, but it has also resulted in new concerns about a lack of supply, with inadequate numbers and types of electric vehicles available to buy.[18]

Regulation can help to drive a greater supply of EV models from manufacturers and faster uptake by fleet operators.

> **“...production volumes [of electric vehicles] are insufficient, with demand outstripping supply for many models, resulting in long waiting times”**
> **Science and Technology Committee report, July 2019[19]**

How to help low income households own EVs sooner

The current pace of the transition to electric vehicles means that lower income households could be trapped into owning and driving the more polluting vehicles for years to come.

Improving public transport infrastructure to serve poorer communities who live in rural or suburban areas should be the long term strategy. But many low income households who live in these areas currently have no choice but to own cars.

However, those on low incomes will be priced out of EV ownership for some time. The plug-in grant scheme has kickstarted the market but EVs are still too expensive for many people.

Accelerating EV sales, especially in the fleet sector, will ensure a more ready supply to the second hand market. But the automotive industry is still putting very few electric models on the market and has yet to rise to the challenge. It commits relatively low advertising spend and there is a lack of engagement with dealerships to promote and sell EVs.

EU vehicle emissions regulation has driven a recent surge in EV production but much more sustained policy signals are needed to shift long term investment away from petrol and diesel vehicles towards EVs. We recommend the government achieves this through the following fiscal and policy incentives:

end the sales of petrol and diesel vehicles by 2030, and introduce a zero emissions vehicle mandate on manufacturers, requiring a minimum proportion of their cumulative annual sales to be battery EVs;

extend the plug-in grant to 2025, when EVs will become the cheapest models;

support cost effective access to charging in workplaces, to increase consumer confidence to buy EVs;

encourage the uptake of electric vehicles by fleets by increasing vehicle excise duty for new petrol and diesel vehicles.

Endnotes

[1] Reuters, 10 January 2019, 'VW, China spearhead $300 billion global drive to electrify cars'

[2] H Barnes, 2019, *Emissions vs exposure: increasing injustice from road traffic-related air pollution in the United Kingdom*

[3] Department for Transport, 2018, National Travel Survey

[4] World Health Organisation, 2010, *Economic Costs of deaths from air pollution*

[5] Department for Transport, 2018, op cit

[6] Department for Transport, 2018, op cit

[7] Frontier Economics, 2019, *Electrifying the UK: ensuring the transport revolution benefits everyone*

[8] G Mattioli, 2017, *'Forced car ownership' in the UK and Germany: socio-spatial patterns and potential economic stress impacts*

[9] Frontier Economics, 2019, op cit

[10] All values of electric vehicles are derived from the Electric Vehicle Database in September 2019

[11] Government Office for Science, March 2019, *Inequalities in mobility and access in the UK transport system*

[12] Office for National Statistics, April 2019, 'Household expenditure on motoring for households owning a car, by gross income decile group, UK, financial year, year ending 2018'

[13] Department for Transport figures, sourced from AM Online in September 2019

[14] This graph illustrates the ratio of used car transactions to car ownership across income groups. The lowest income group is responsible for roughly one per cent of car ownership but nine per cent of all used car transactions. The bottom 40 per cent of the income range is responsible for a quarter of the used car transactions but are responsible for less than ten per cent of car ownership. The data is based on the average of 15 EU countries but aligns significantly with the UK on several indicators. Statistical source: European Commission, DG Climate Action, May 2016, *Data gathering and analysis to improve the understanding of 2nd hand car and LDV markets and implications for the cost effectiveness and social equity of LDV CO2 regulations*

[15] RAC Foundation, April 2019, *Transport Poverty 2017-2018*

[16] Go Ultra Low, 11 January 2018, 'UK business urged to go electric and save £625 million'

[17] *Autotrader*, January 2019, 'Auto trader retail price index 2018'

[18] *Fleetnews*, 16 September 2019, 'Company car tax change prompts surge of interest in EVs'

[19] House of Commons Select Committee on Science and Technology, August 2019, 'Clean growth: technologies for meeting the UK's emissions reduction targets'

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Green Alliance
Green Alliance is an independent think tank and charity focused on ambitious leadership for the environment. Since 1979, we have been working with the most influential leaders in business, NGOs and politics to accelerate political action and create transformative policy for a green and prosperous UK.

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