Supplementary written evidence submitted by Green Alliance (EVP0151)

Total cost of ownership analysis

Green Alliance commissioned new analysis on the total cost of ownership (TCO) of first, second and third hand cars, comparing battery electric and other types of vehicles. This document, prepared for the Transport Select Committee, outlines the main findings from the modelling analysis, some of which were published in Green Alliance's report, *Accelerating the electric vehicle revolution*.

Summary

Building on the government's decision to bring forward the ban on the sale of new petrol and diesel cars, it is vital that the transition to battery electric cars is accelerated to maximise emission reductions in line with the Climate Change Committee's recommendations. Battery electric cars accounted for less than 7% of new car sales in 2020, but the Climate Change Committee recommends that they make up nearly 50% of new car sales by 2025 and almost all new car sales by 2030.

The cost of battery electric vehicles will play an important role in determining the speed of the transition. Upfront costs are currently higher, although they are expected to come down significantly in the coming years as battery costs fall, with estimates suggesting they will reach upfront cost parity later in the decade.[i]

However, by considering the total cost of ownership (TCO)[1], there are opportunities to unlock cost benefits sooner. This is because battery electric cars are cheaper to run than conventional cars and have fewer parts, which reduces maintenance costs.

Green Alliance has commissioned new analysis into the total cost of ownership. The analysis was conducted by Element Energy and is summarised in this document (for more information on the methodology, see last page of this document).

The main findings are:

- For medium and small cars bought today, battery electric vehicles are already cheaper than any other type of car on a total cost of ownership over their entire lifetime. This suggests that promoting new car financing schemes, which structure pricing largely on a TCO basis, could provide opportunities to unlock the lifetime benefits of battery electric vehicles over other types of cars from day one.

[1] The total cost of ownership (TCO) compares vehicles beyond their purchase price to assess the real cost for consumers over the course of successive ownerships of a vehicle. This includes: vehicle pricing and component costs; efficiency measures required by regulation; market depreciation; fuel or electricity costs and consumption; taxes (VAT, registration tax, annual tax) and subsidies; insurance and maintenance costs.

- With current purchase subsidies, the cost of ownership of a new medium size battery electric car over the first four years is already cheaper than a petrol equivalent. But without subsidies, new medium size battery electric cars will not become cost competitive until 2023. This highlights the importance of keeping subsidies in place in the near term, so that battery electric cars remain competitive compared to their petrol equivalents.
- For medium and small sized battery electric cars bought new today, their eventual second and third owners will achieve significant cost savings compared to owners of petrol or diesel equivalents, on a total cost of ownership basis. Crucially, this would unlock cost savings to lower income car owners, who are far more likely to buy used vehicles.
- Plug-in hybrid cars are more expensive than battery electric vehicles, on a total cost of ownership basis, and could be significantly more expensive if they are not charged regularly.

Building on the points above, we would especially emphasise the need to ensure more battery electric cars reach the used vehicle market, to unlock cost savings to lower income car owners. Today, battery electric cars represent a very small fraction of the used car market and the current pace of the transition to electric vehicles means these households could be trapped into owning more polluting, expensive vehicles for much longer than they need to be.

A number of policies are needed to accelerate uptake of new battery electric vehicles, and ensure more enter the second hand market sooner. These include consumer incentives, as well as funding and policy to scale up charging infrastructure. But the pace of change also depends on adequate supply of clean vehicles. Our report, *Accelerating the electric vehicle revolution*, recommends that the government introduces a zero emission vehicles mandate to boost sales of battery electric vehicles.

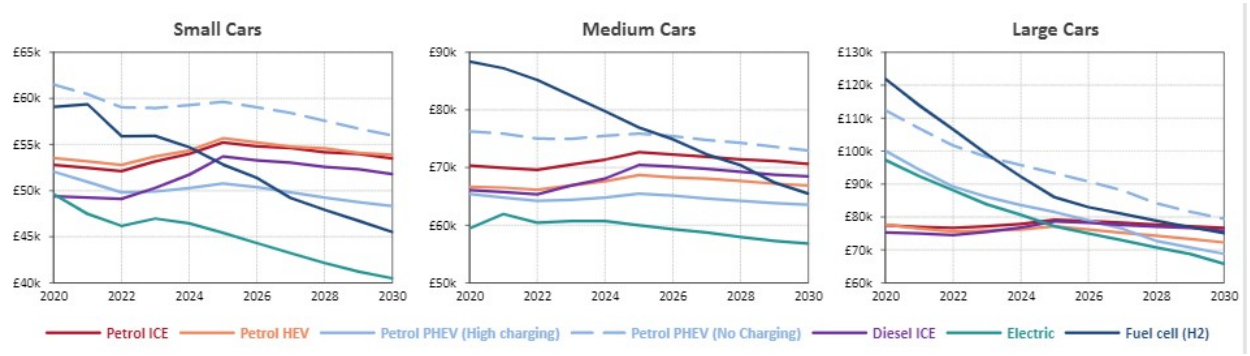
Small and medium battery electric cars are already the cheapest option, on a lifetime total cost of ownership (TCO) basis

For medium and small cars bought new today, battery electric vehicles are already cheaper than any other type of car on a total cost of ownership over their entire lifetime. This suggests that promoting new car financing schemes, which structure pricing largely on a TCO basis, alongside a wider leasing market, could unlock the lifetime benefits of battery electric vehicles over other types of cars from day one.

Large cars are set to become the cheapest option by 2025.

TCOs for petrol plug-in hybrid electric vehicles (PHEVs) are highly dependent on consumer charging behaviour, and if not charged at all, PHEVs become significantly more expensive, providing the worst financial value of any powertrain (excluding fuel cells).

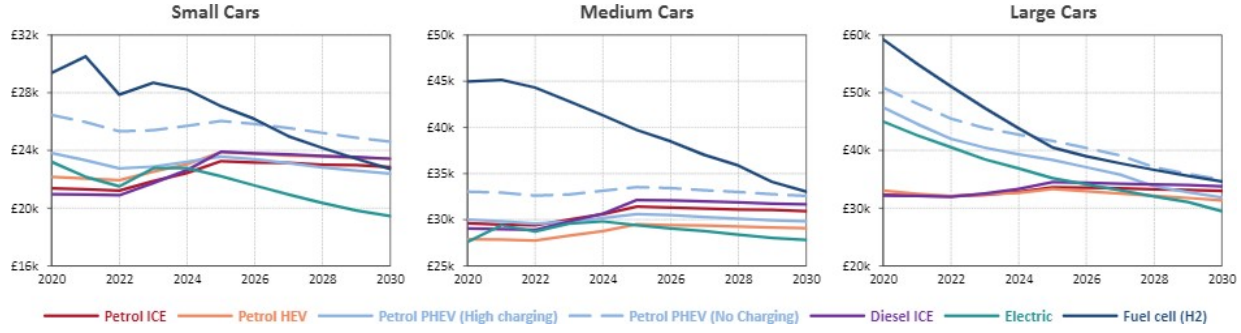
Lifetime TCO (years 1 to 16, £)



Small and medium cars will become the cheapest powertrain for first owners by 2025, with large cars following in 2028

The cost of ownership of battery electric vehicles will drop significantly over the next years, driven by falling battery costs. The TCO for the first owner of a small or medium battery electric car is expected to be lower than any other type of car by 2025, with the TCO of medium sized battery electric cars bought new in 2021 already comparable to that of conventional petrol and diesel equivalents.

TCO for first owners (over four years)

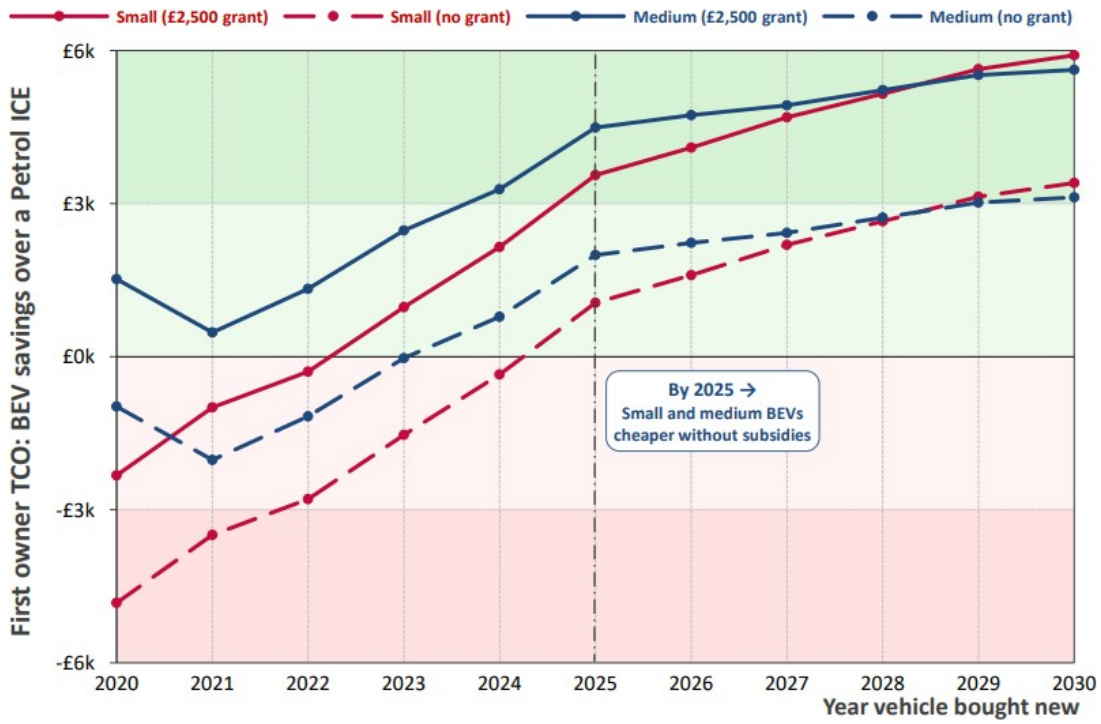


Removing purchase subsidies would delay the point when battery electric cars become cheaper than petrol cars for first hand owners

New medium sized battery electric cars are already cheaper than petrol equivalents for first hand owners (over four years of ownership), thanks to current purchase subsidies. Purchase grants would enable small cars to also become cost competitive for first hand owners (on a TCO basis) by 2023. Instead, removing the grants would push back the date at which new small and medium size battery electric vehicles reach cost-competitiveness to 2025 and 2023, respectively.

This highlights the importance of retaining purchase subsidies in the near term to ensure greater uptake of battery electric vehicles and ultimately push more of these onto the used car market.

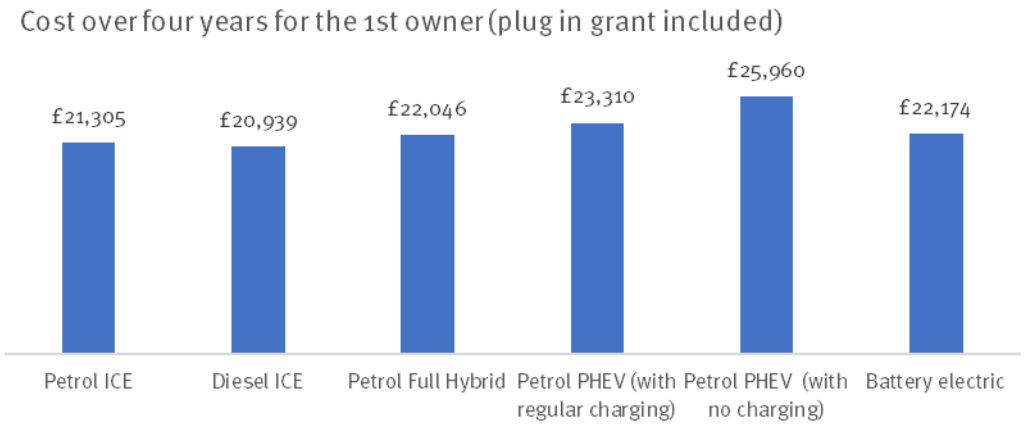
Comparison of TCO for first owners of battery electric vs petrol car

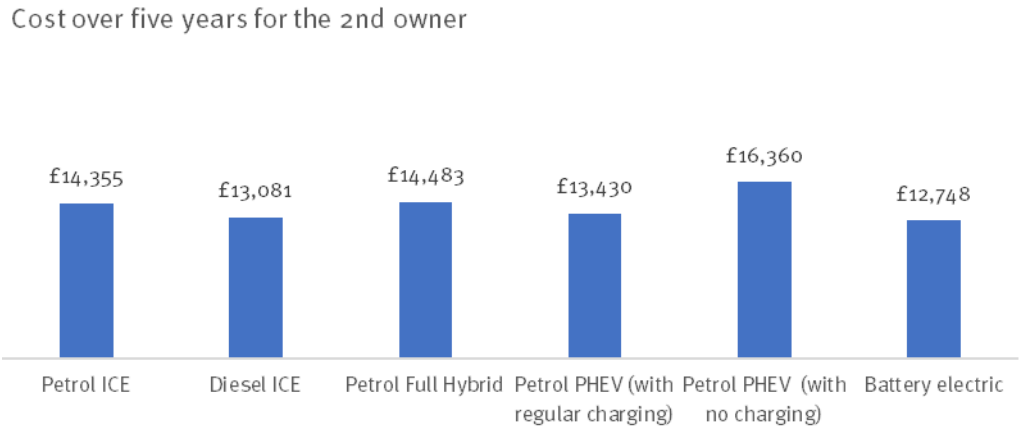


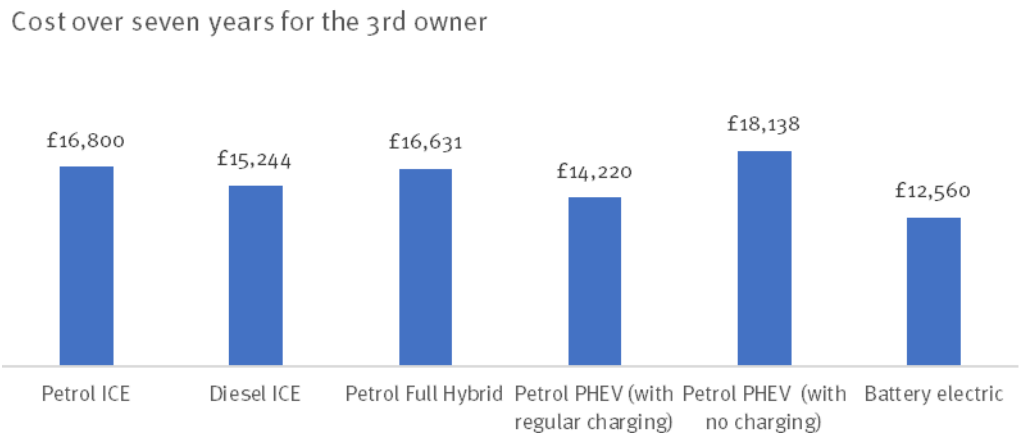
Small and medium battery electric cars bought new today will already save thousands to their second and third hand owners.

Small battery electric cars, bought new today, will save their eventual second owner between £300 and £1,600 compared to diesel and petrol equivalents, respectively, on a total cost of ownership basis. And they will save their third owner between £2,700 and £4,200.

TCO for a small car first bought in 2021

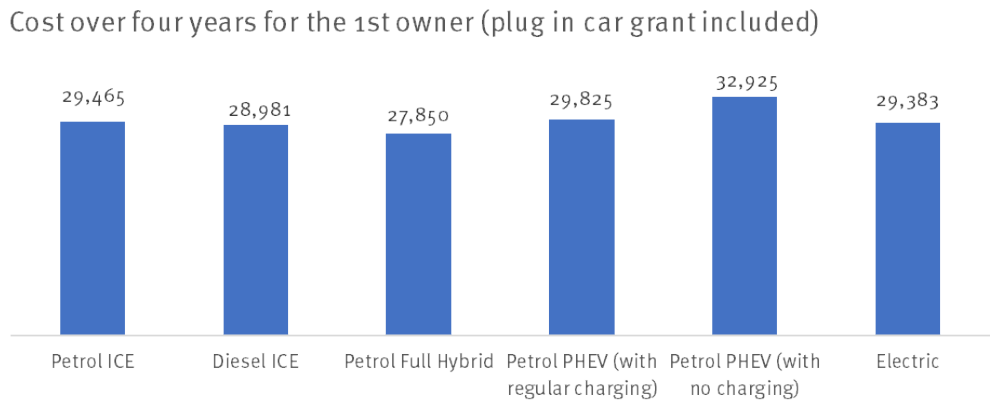


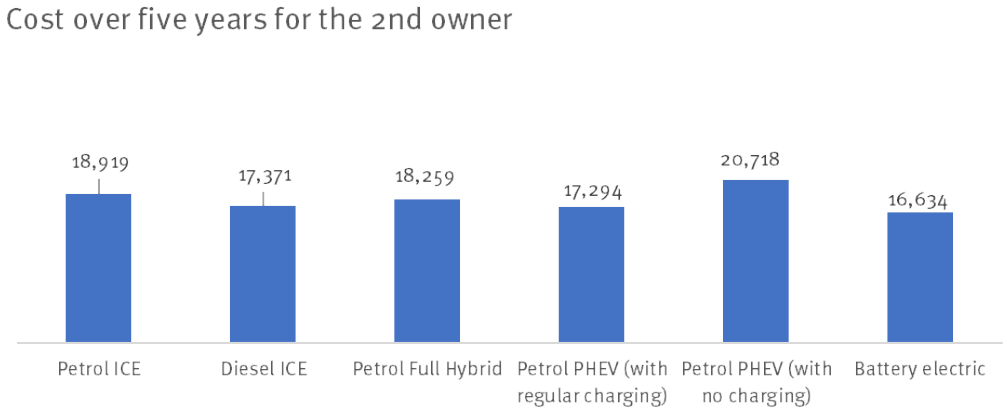


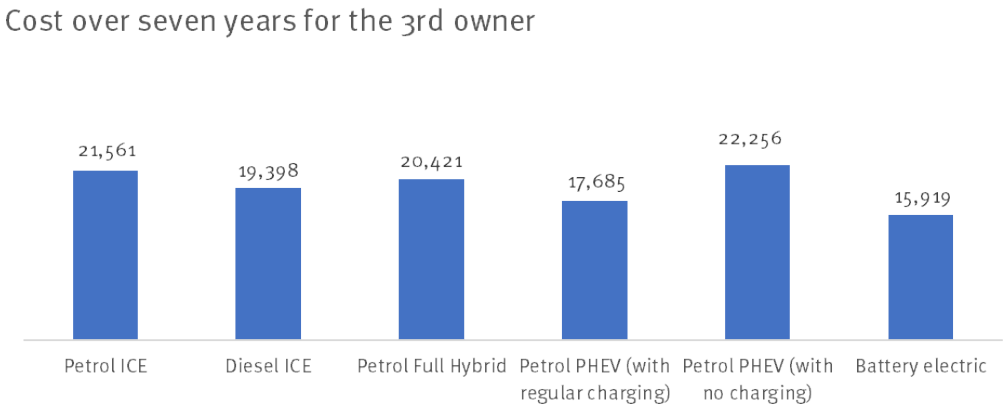


Used medium size battery electric cars also lead to cost savings. For a medium size battery electric car bought new today, their eventual second owner could save between £700 and £2,300 compared to the owner of a second hand diesel or petrol equivalent, respectively, on a total cost of ownership basis. Savings for third owners are estimated to be between £3,500 and
£5,600 compared to diesel and petrol alternatives, respectively.

TCO for a medium car first bought in 2021 (£)





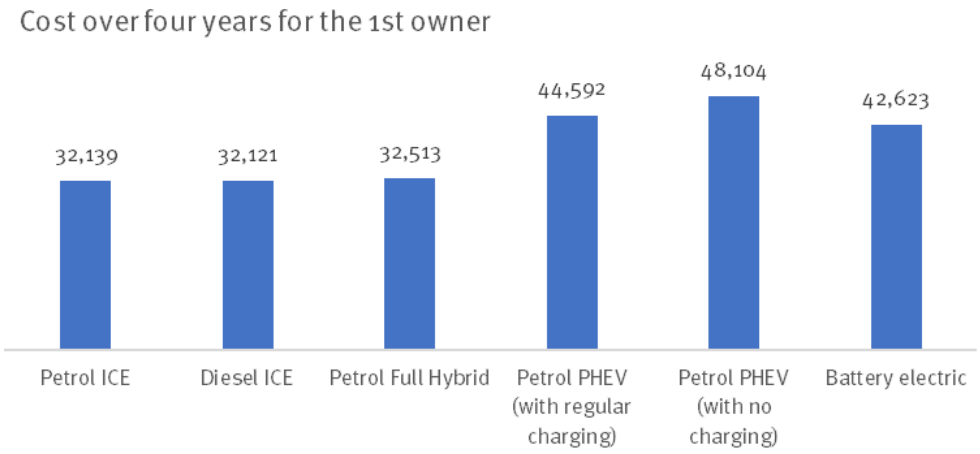


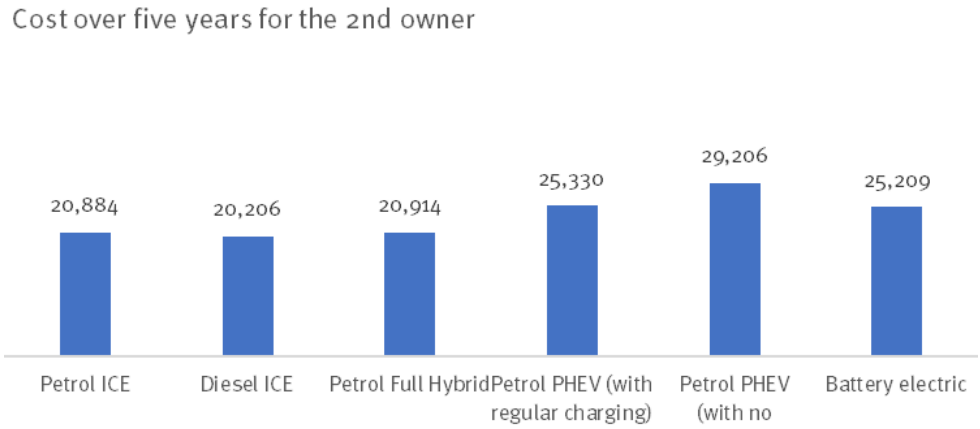
Large cars will become cost competitive in the coming years

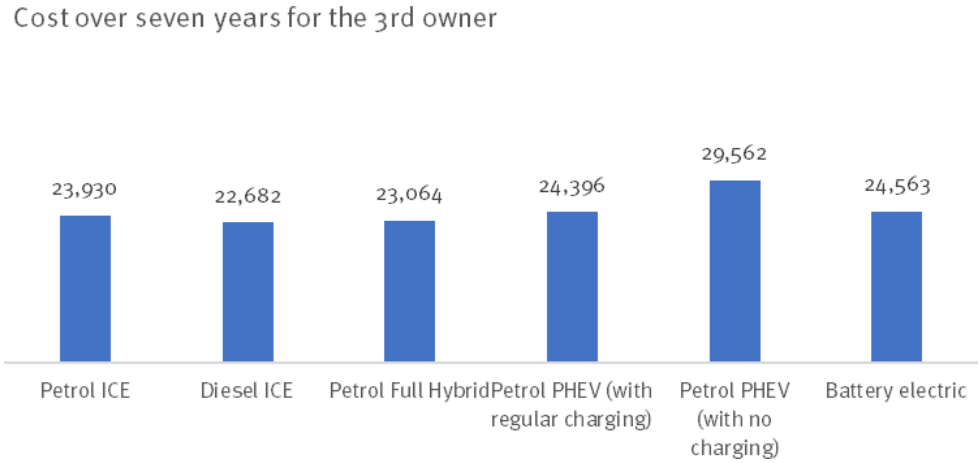
Large battery electric cars bought new in 2021 are not yet cost competitive with petrol and diesel equivalents, on a TCO basis.

For first owners, they are set to become cheaper than other types of vehicles later in the 2020s, on a total cost of ownership basis. But for used cars, cost competitiveness will be achieved sooner: large cars bought new in 2025 will be the cheapest option for their second owners, and large cars bought new in 2023 will be the cheapest type of car for their eventual third owners.

TCO for a large car first bought in 2021 (£)







Methodology

This analysis was conducted by Element Energy. The total cost of ownership (TCO) compares vehicles beyond their purchase price to assess the real cost for consumers over the course of successive ownerships of a vehicle. This includes: vehicle pricing and component costs; efficiency measures required by regulation; market depreciation; fuel or electricity costs and consumption; taxes (VAT, registration tax, annual tax) and subsidies; insurance and maintenance costs.

The analysis followed the approach adopted in a similar study at EU level (see Element Energy, 2021, *Electric cars: calculating the total cost of ownership for consumers*), with some specific adjustments for the UK context, including: plug-in car grant available until March 2023 (up to £3,000 in 2020, up to £2,500 from March 2021 until March 2023, with no further purchase subsidies after that); current tax incentives and CO_2 banding for vehicle excise duty remain constant; no VAT for used cars; price of energy based on UK average residential electricity price (22p/kWh); fuel price assumes fuel duty and VAT remain constant at 2020 levels; UK car purchase prices are forecast based on Element Energy's bottom up cost and performance modelling.

June 2021