Not going the extra mile: driving less to tackle climate change

December 2021

Methodology

Emissions overshoots for each scenario were calculated against the baseline (the CCC's balanced pathway scenario), by multiplying the annual mileage of the car fleet by the emissions factors for internal combustion engines (ICE) and plug-in hybrid vehicles (PHEV). The overall UK car mileage was calculated using an average mileage per car (from the Climate Change Committee), multiplied by the fleet size.

The published report looks at the traffic levels for cars only, however the corresponding calculations for vans were also conducted (see below).

Both emissions factors and mileage varied across the scenarios. Assumptions for these are below.

There are four scenarios that were developed in total, although the report only shows the findings for three of these. The CCC balanced pathway is the baseline scenario, and the Department for Transport (DfT) BEV uptake scenario is another. Two further scenarios were also developed:

Fast uptake rate, the CCC's balanced pathway: this is the baseline reference scenario and is based on the CCC's balanced pathway assumptions laid out in the Sixth Carbon Budget.

Moderate uptake rate: this scenario assumes government policies go further than currently, but not to the extent to deliver the ambitious pathway set out by the CCC balanced scenario.

Medium uptake rate: this scenario assumes there are limited new policies adopted by government compared to today. This scenario broadly aligns with DfT's central ZEV uptake projection as per the 2035 Delivery Plan for an EV transition.[i]

Slow uptake rate, DfT's scenario: this scenario assumes there are limited new policies adopted by government compared to today. This is the lower boundary and most pessimistic pathway in terms of BEV uptake rates, according to DfT's 3025 Delivery Plan for an EV transition (*ibid*).

Assumptions

For 2020 sales figures, PHEV and BEV car 2020 figures were reported by the Society of Motors, Manufacturers and Traders (SMMT, 2021, 'UK New Car and LCV Registrations Outlook to 2022'). PHEV and BEV van 2020 sale figures were reported from the Department for Transport (DfT, 2020, 'Licensed ultra low emissions vehicles by body type and propulsion or fuel type: United Kingdom', Table VEH0133)

Projections for the uptake rate of new ICE, BEV and PHEV cars and vans up to 2030 in the moderate and medium uptake rate scenarios were taken from Green Alliance's ZEV Mandate report (2021).

Emissions factors were taken from data provided by the Climate Change Committee for the baseline scenario. For ICE vehicles in the alternative scenarios, a 50:50 petrol: diesel split of fuel was assumed; emissions factors came from Defra (Defra, 2020, Table: 'Conversion factors 2020 – full set for advanced users') and the trend to 2030 followed the curve of the CCC balanced pathway emissions factors curve. Actual fleet numbers came from DfT (DfT, 2020, 'Licensed cars by propulsion or fuel type: Great Britain and United Kingdom', Table VEH0203, and 'Licensed light goods vehicles at the end of the year by propulsion and fuel type: Great Britain and United Kingdom'), Table VEH0403).

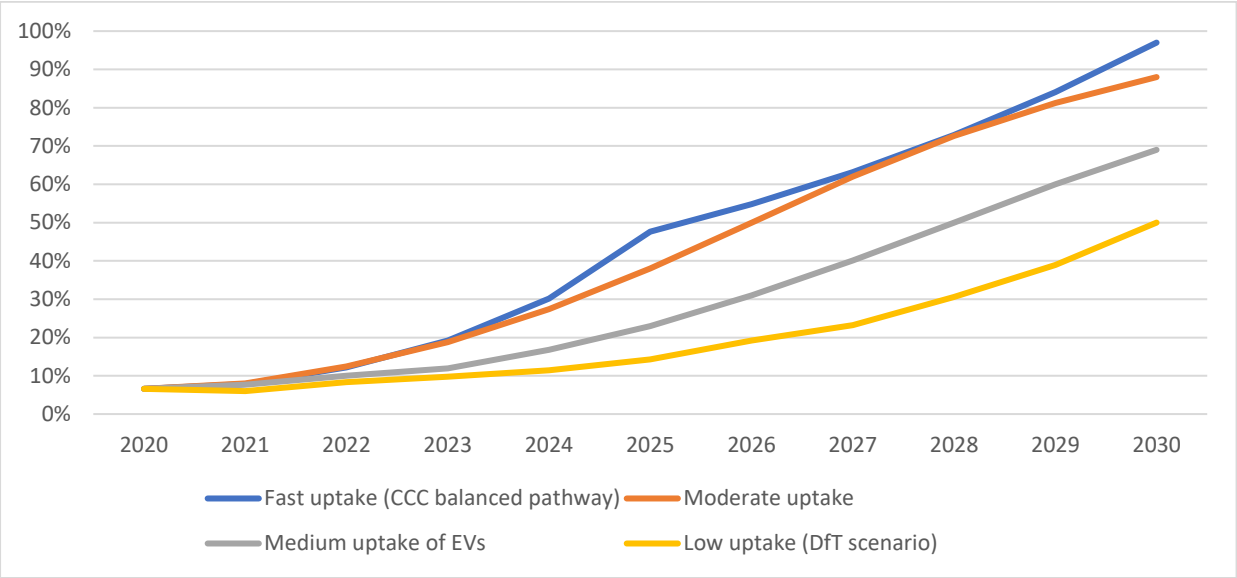
BEV vehicle emission factors in all scenarios follow the CCC balanced pathways scenario.

PHEV vehicle emission factors were split into direct and indirect emissions: direct emissions were uplifted from the CCC direct emissions to match the average 117gCO2/km as per T&E's data (T&E, 2020, 'UK briefing: the plug-in hybrid con'); indirect emissions were calculated by reducing the CCC indirect emissions data for ICE cars by the same factor as the uplift for direct emissions. This is to reflect the decarbonisation of the power grid.

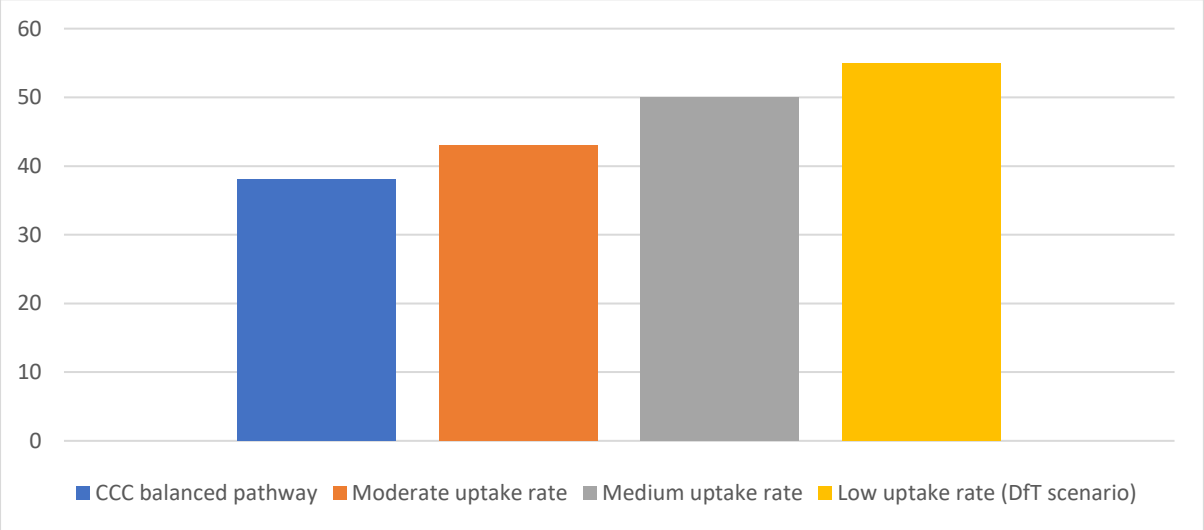
New vehicle sales and the predicted growth in fleet size are based on CCC data.

Findings for the moderate uptake rate scenario

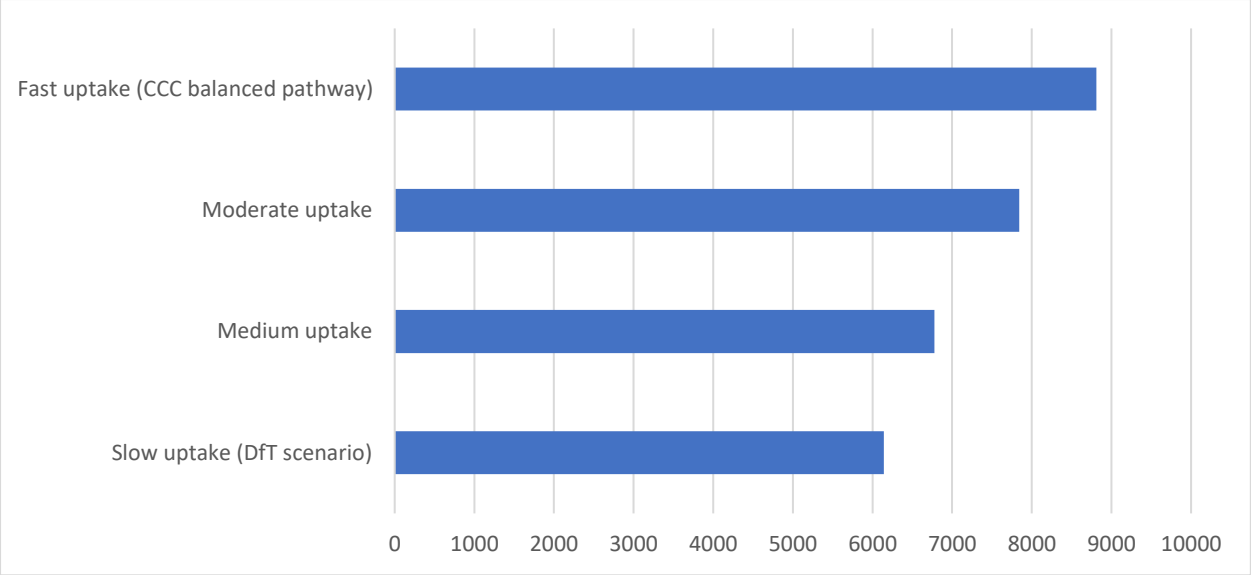
Four scenarios were modelled however only three were presented in the final report. The findings for the final scenario, 'moderate uptake rate' are as follows.



BEV uptake rates reach 88% in 2030.



The emissions overshoot for the moderate uptake scenario is 43MtCO2e.



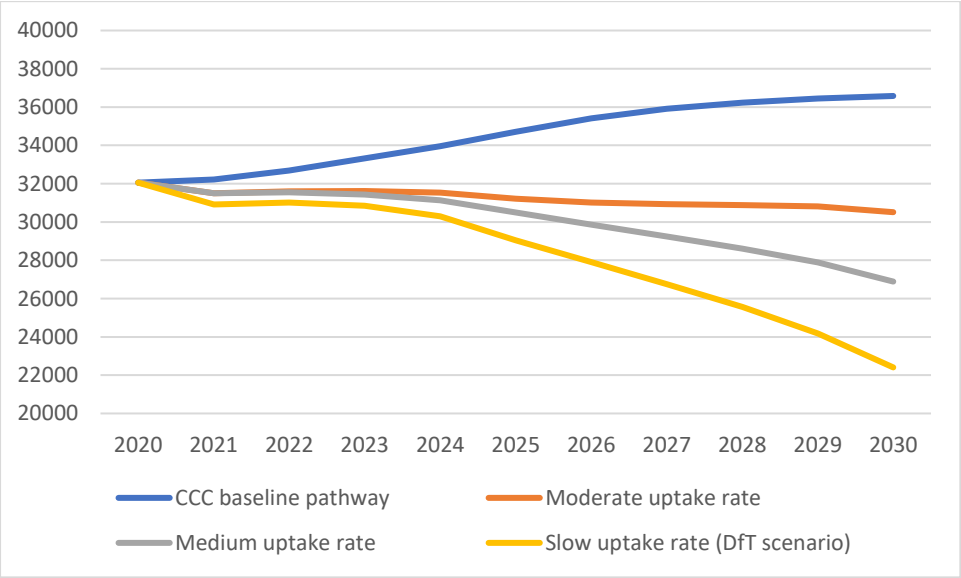
The mileage reduction needed in the moderate scenario is 1972 miles per car per year.

Varying the fleet size

The published report looks at the instance in which fleet size increases over time, in line with data from the CCC in predicted sales.

An alternative analysis is to this is keeping the mileage per car constant and varying the fleet size to mitigate emissions overshoots of the alternative scenarios.

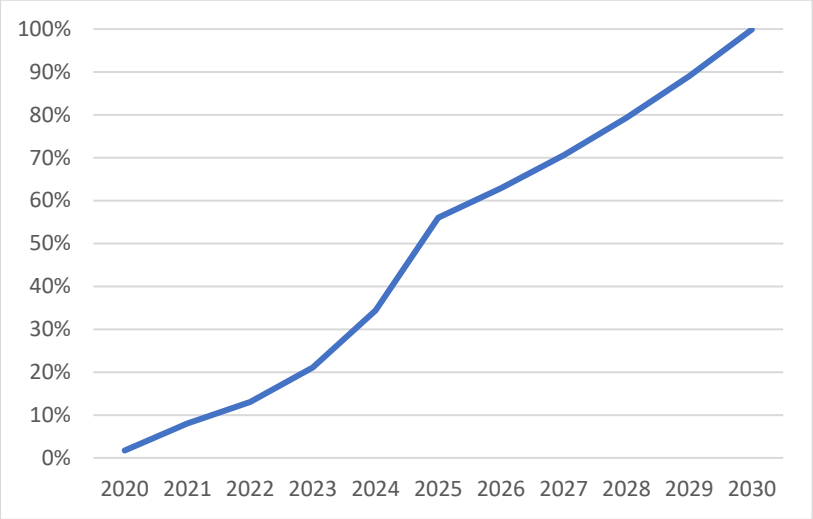
In this case, the fleet size would need to decrease by 4.7% to mitigate the emissions overshoot in the moderate uptake rate scenario, 16.1% in the medium uptake rate scenario, and a 30% reduction in the slow uptake scenario. This equates to 1.5 million, 5.2 million, and 9.7 million fewer cars in the 2030 fleet compared to 2020 figures.



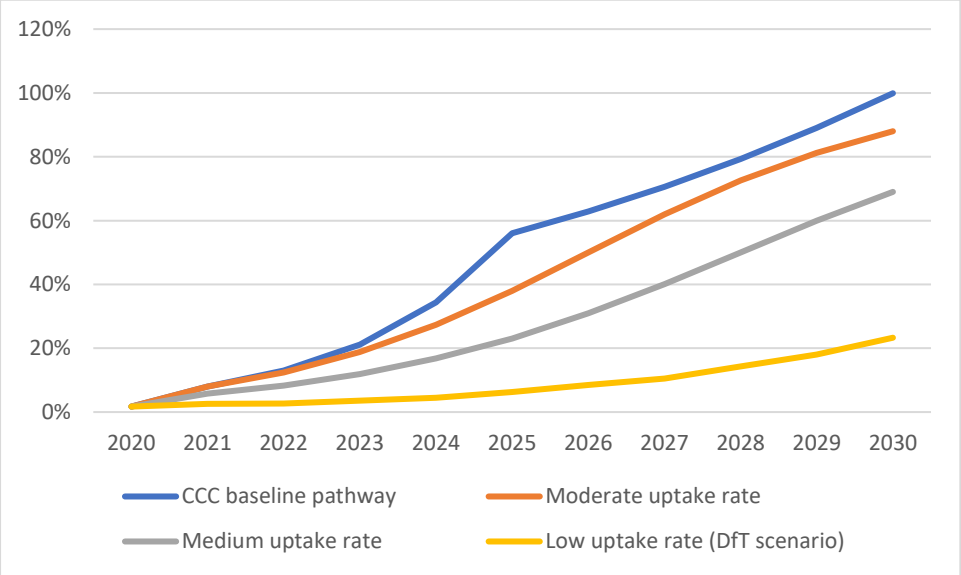
Traffic reduction levels needed to address emissions overshoot in the scenarios for vans

The published report shows the emissions overshoot and therefore the traffic reduction needed for cars only. The analysis was also conducted for vans, and the corresponding findings are below.

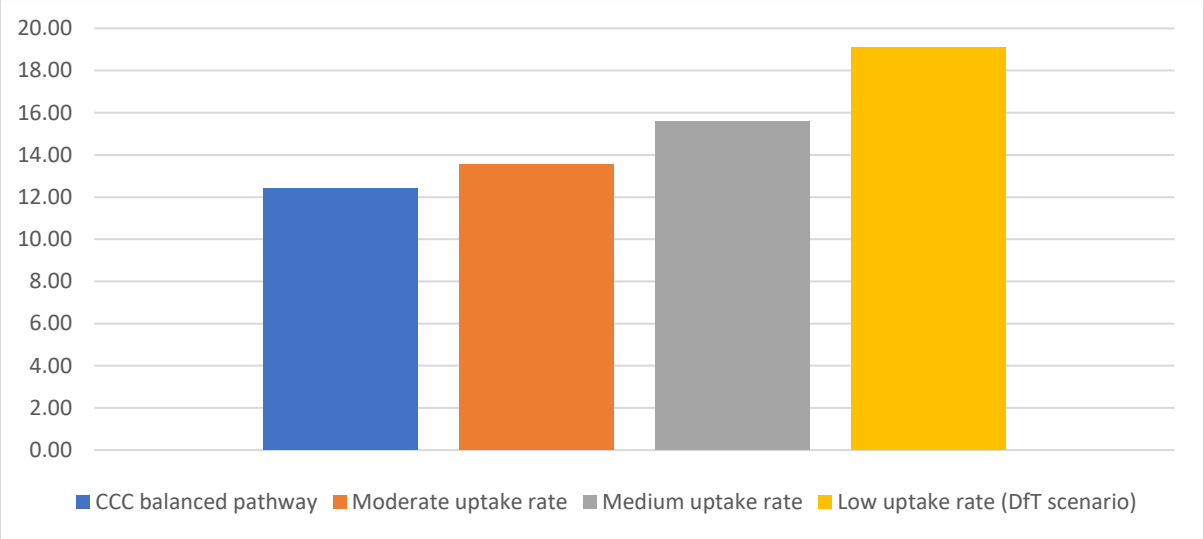
The CCC's balanced pathway scenario for vans shows a BEV uptake rate of 99.9% by 2030.



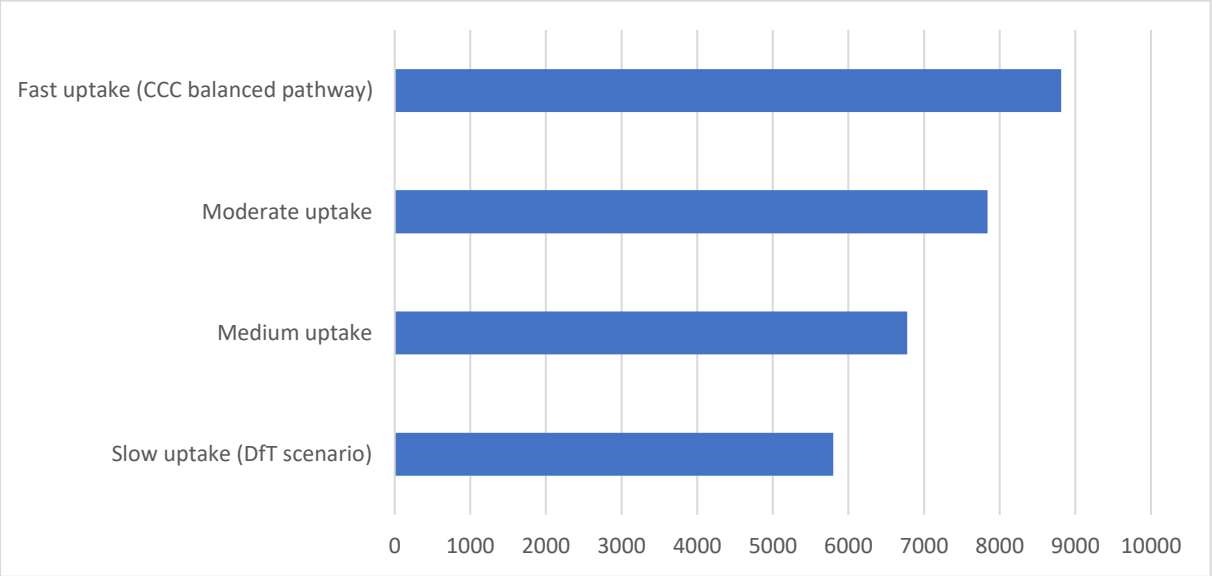
The uptake rate for the alternative scenarios sits at 88%, 69% and 23% in 2030.



The emissions overshoot for vans stands at 1.2MtCO2e in the moderate uptake scenario, 3.2MtCO2e in the medium uptake scenario, and 6.7MtCO2e in the slow uptake scenario, compared to the CCC's balanced pathway.



To mitigate the overshoot, the traffic reduction needed by vans is 972 miles per van per year for the moderate uptake scenario, 2035 miles per van per year for the medium uptake scenario, and 3012 miles per van per year for the slow uptake scenario.



[i] Transitioning to zero emission cars and vans: 2035 delivery plan (publishing.service.gov.uk)