**Notes on low-income households and electric vehicles**

When might lower-income drivers benefit from electric vehicles? Quantifying the economic equity implications of electric vehicle adoption

Bauer, Gordon, Chih-Wei Hsu, and Nic Lutsey. "When might lower-income drivers benefit from electric vehicles? Quantifying the economic equity implications of electric vehicle adoption." *Work. Pap* 6 (2021).

KEY POINTS:

* Battery prices are reducing by approximately 7% each year – which will in turn lower the cost of EV’s
* EV’s have lower maintenance costs than non-EV’s – . ‘Maintenance costs for new 2020 conventional vehicles are assumed to be $0.028 per mile, compared to $0.012 for EVs, increasing gradually to $0.079 per mile for gasoline cars and $0.043 per mile for EVs with over 100,000 miles. These data show roughly 50% cost savings from EVs, similar to values reported in other studies’
* Lower income households tend to purchase older vehicles
* ‘As EV prices fall, we project the total cost savings of electrification will become significant. In 2030, the average 250-mile BEV will cost $900 less to buy than the average gasoline vehicle, and the average household could save $1,400 per year by replacing all of their vehicles with EVs, including over $600/year from both maintenance and fuel savings.’
* Low income households spend larger proportion of income on car-related expenses
* ‘Savings from EVs relative to income are significantly higher for low-income households, non-White households, and households in areas with higher levels of pollution. For car owners in the lowest-income quintile, savings from switching to EVs amount to $1,000 per household annually, or 7% of income, by 2030. Given these benefits from EVs are higher in lessdense car-dependent areas that also tend to have lower housing costs, electrification could provide low-income households with more options for affordable housing’
* ‘Purchase incentives targeting low-income groups may be most effective. Given that low-income households are likely to benefit most from an EV yet are typically less likely to adopt one, there is a clear justification for targeting purchase incentives towards low income consumers’
* Lower income households tend to have older vehicles – both the purchase price and running costs of EV’s will reduce in the coming years
* Also lower income households are more likely to buy used and older vehicles

BEV – battery electric vehicle

PHEV – plug-in-hybrid electric vehicle

Subsidizing Low- and Middle-Income Adoption of Electric Vehicles: Quasi-Experimental Evidence from California

Muehlegger, Erich, and David S. Rapson. *Subsidizing low-and middle-income adoption of electric vehicles: Quasi-experimental evidence from california*. No. w25359. National Bureau of Economic Research, 2018.

KEY POINTS:

* Californian experiment 2016? - Enhanced Fleet Modernization Program (“EFMP”) - a retire-and-replace subsidy program for EV purchases– EV subsidies targeted towards low-income households
* Means tested – offered up to $4500 to replace vehicle with a lower-emission vehicle – amount varies depending on income and exact fuel type of vehicle – includes incentives to buy new and used EV’s
* Note state subsidies already were in place also
* ‘Past incentive programs typically offered a blanket subsidy to all vehicle buyers, the take-up of which is strongly correlated with income’ - ‘high income households were significantly more likely adopt EVs and claimed the vast majority of federal vehicle incentives’
* We need mass-market adoption
* ‘To qualify for the EFMP program, a household must reside in a “disadvantaged zip code”, a zip code that (wholly or partially) contains a disadvantaged census tract.’
* They would run events and direct marketing in these areas and eligible buyers are guided through the application process and, if eligible, are directed towards the websites of participating dealerships.
* They noticed a rise in EV sales in disadvantaged areas
* They ran ‘Tune-in, Tune-up’ smog testing events – tested vehicles and offered guidance on how to apply
* We will need more charging facilities to accommodate an increase in EVs

Questions – do we need widespread EV adoption to achieve target pollution levels?

<https://www.bristol.gov.uk/newsroom/bristol-businesses-to-benefit-from-free-electric-vehicle-trials>

‘over 300 organisations have already signed up for more information on the scheme’