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Author
Jenn, Alan

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POLICY BRIEF

Electrifying Ride-Sharing: Transitioning to a Cleaner Future

Alan Jenn
Institute of Transportation Studies, University of California, Davis

Issues

Incentives for plug-in electric vehicles (PEVs) are typically designed to encourage broad consumer adoption of the new technology. However, maximizing the emissions benefits from electrifying the transportation sector also requires incentives targeted at stakeholders with high travel intensity, i.e., those with particularly high passenger occupancy and/or vehicle-miles traveled (VMT). This policy brief focuses on one such class of stakeholders: transportation network companies (TNCs) such as Uber and Lyft. It examines empirical data of electric vehicle use in TNCs and discusses research findings on the potential impacts of electrifying TNCs. It also raises important considerations for the development of future policy.

Key Research Findings

1. Emissions Benefits

The emissions benefits of increased PEV use by TNCs are substantial for two reasons (Figure 1): (1) electric vehicles in California typically generate less CO2 emissions and less local air pollution than gasoline-powered cars; and (2) vehicles serving TNCs travel much more than the average car. This research project tracked PEVs with full-time drivers in TNC programs and found that each vehicle drives an average of 160 miles and uses about 45 kWh of electricity per day. The emissions from generating electricity for that travel releases about 21 lbs of CO_2, compared to over 100 lbs in a comparable conventional vehicle. The research shows that the tracked TNC vehicles already avoid about 1,000 tons of CO2 emissions every year as a result of PEV use in San Diego, Los Angeles, and San Francisco (Figure 2).

2. Importance of Charging Infrastructure

Charging infrastructure is important for all PEVs, but the specific needs may be different for TNC PEVs. Researchers observed four key differences in charger use by full-time TNC PEVs compared to charger use by privately owned PEVs:

1. TNC PEVs charge at different times of the day.
2. TNC PEVs make more frequent visits to public charging stations: 2.5 times a day on average, with an average of 22 kWh gained per charge.
3. TNC PEVs charge almost exclusively on DC fast chargers (high-voltage units operating at 50 kW or above).
4. The rapid growth of TNC PEV fleets has led to "saturation" at certain chargers.

The heightened demand for charging from TNC PEVs has led to high utilization of public charging infrastructure. Expanding charging infrastructure will be an important contributor to the future success of PEVs in TNCs.

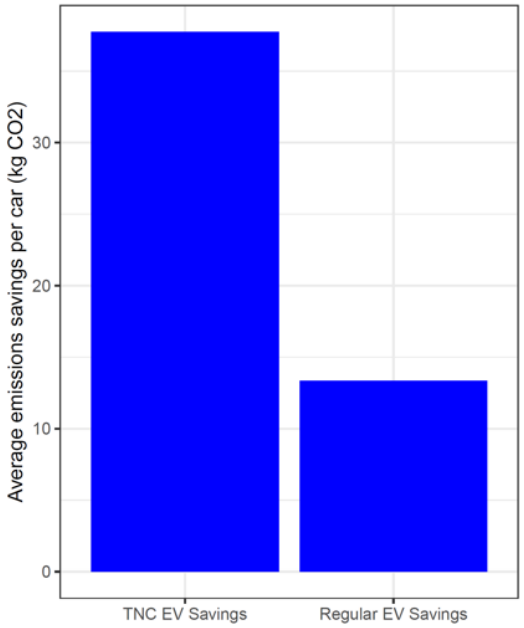

Figure 1: Comparison of carbon emissions savings for EVs in TNC use vs. private use.

If TNC drivers are not confident in the ready availability of fast, reliable chargers, they may consider refueling to be an insurmountable obstacle to using a PEV on the job. Providing vehicle purchase incentives, alone, is insufficient to encourage TNC adoption of PEVs. Complementary incentives for installation of infrastructure are needed.

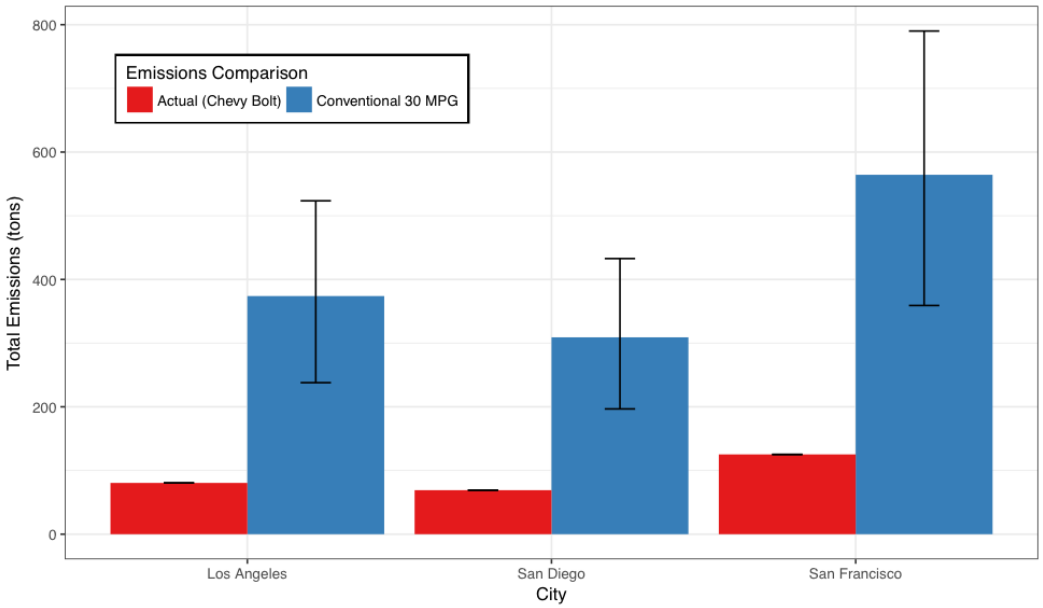

Figure 2: Total actual emissions (red) from the all-electric TNC fleets operating in three major California cities compared to hypothetical emissions (blue) if those fleets were gas powered.

3. Other Considerations

Setting specific targets for electrifying TNCs would help establish clear goals, provide policy certainty for TNCs, and create a level playing field for service providers. California has a rich and successful history of using targets to promote technological innovation and adoption in other aspects of transportation (e.g., the Zero Emissions Vehicle mandate or the Executive Order target of 1.5 million PEVs by 2025). These goals are critical factors in the transition towards a cleaner and sustainable transportation and energy future; targets within the TNC realm would likewise provide strong motivation to transition to this outcome.

Policy to encourage or require TNCs to incorporate more PEVs must account for differences between privately owned vehicles and ones serving TNCs. Since TNCs typically don't own their fleets, a purchase-based incentive is unlikely to succeed. A more effective strategy would be to establish a use-based incentive such as a fuel rebate or discount. This incentive structure would support the California Clean Miles Standard and Incentive Program and would be particularly attractive for TNCs in light of their high daily VMT. The incentive would have to be carefully designed and administered to ensure it worked as intended.

Another large benefit of promoting PEVs in ride-sharing services such as Uber and Lyft is that it will help to raise awareness of electric-vehicle technology. Previous work by researchers at the UC Davis Institute of Transportation Studies has shown that there is still a very large gap in knowledge and awareness among the general public. Electrifying TNC services will expose more people to PEVs, likely expanding the pool of people considering purchasing a PEV for private use.

It is important to consider low-income drivers who may not be able to afford PEVs even with higher purchase incentives. However, there are a number of business cases that can fulfill an electrification requirement without harming opportunities for these drivers—rental business models such as Maven, for example. A use-based incentive, rather than a purchase incentive, would help level the playing field for PEVs relative to traditional gasoline vehicles for rental models while providing accessibility for lower income drivers.

Further Reading

This policy brief is drawn from "Emissions Benefits of Electric Vehicles in Uber and Lyft Services," a research report from the National Center for Sustainable Transportation, authored by Alan Jenn of the University of California, Davis. The full report can be found on the NCST website at https://ncst.ucdavis.edu/project/investigating-use-electric-vehicles-new-mobility-services.

For more information about the findings presented in this brief, please contact Alan Jenn at ajenn@ucdavis.edu.

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