National Center for Sustainable Transportation

POLICY BRIEF

Electrifying Ride-sharing: Transitioning to a Cleaner Future

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Issues

Incentives for plug-in electric vehicles (PEVs) are typically designed to encourage broad consumer adoption of the new technology. However, maximizing electrification of the transportation sector also requires incentives targeted at stakeholders with high travel intensity, i.e., those exhibiting 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: (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 in the Maven program (a PEV rental fleet for Uber and Lyft owned by General Motors) and found that each vehicle drives an average of 180 miles and uses about 50kWh of electricity per day. This corresponds to about 5 pounds of CO2 emissions per Maven PEV per day. (Because PEVs do not generate emissions while in operation, this figure represents the estimated emissions generated upstream by the power plants that provide electricity to vehicle chargers.) The research shows that Maven already avoids about 1,000 tons of CO2 emissions every year as a result of PEV use in San Diego, Los Angeles, and San Francisco (Figure 1).

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 Maven PEVs compared to charger use by privately owned PEVs:

1. Maven PEVs charge at different times of the day.
2. Maven PEVs make more frequent visits to public charging stations: 2.5 times a day on average, compared with once every two weeks for privately owned vehicles.
3. Maven PEVs charge almost exclusively on DC fast chargers (high-voltage chargers operating at 50kW).
4. The rapid growth of Maven PEV fleets has led to "saturation" at certain chargers.

The heightened demand for charging from TNC PEVs like Maven's has led to high utilization of public charging infrastructure. The extent to which PEV infrastructure is further developed and improved to accommodate increased demand will dictate the future success of PEVs in TNCs. 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. The takeaway is that providing incentives, alone, to encourage TNC adoption of PEVs is insufficient. Complementary incentives for installation of infrastructure are needed to support PEV use.

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 Executive Order B-16-12 to reach 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.

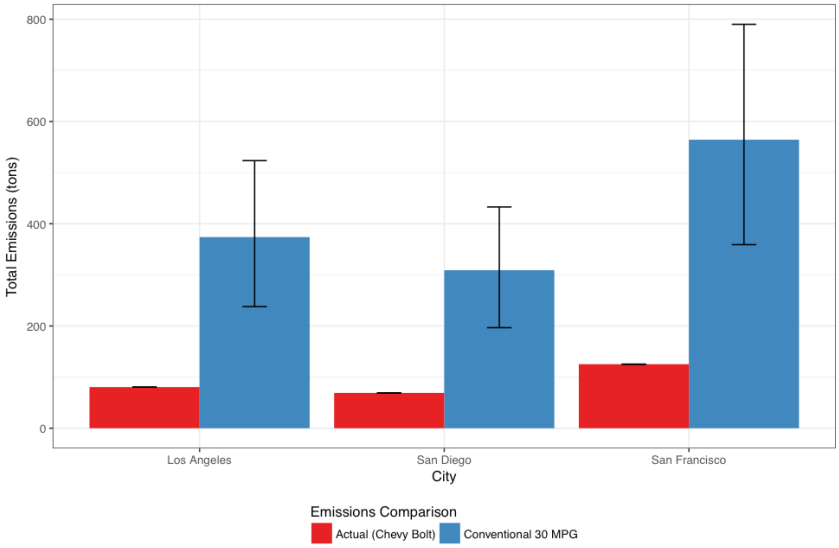

Figure 1: Total actual emissions (red) from the all-electric Maven fleets operating in three major California cities compared to hypothetical emissions (blue) if the fleets were gas powered.

Policy to encourage or require TNCs to incorporate more PEVs must be carefully constructed to account for differences between privately owned vehicles and vehicles serving TNCs. Since TNCs typically don't own vehicles within 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 has already been demonstrated in the California Clean Miles Standard and Incentive Program and would be particularly attractive for TNCs in light of their high daily VMT. Careful consideration would need to be placed on administration of the incentive with some ability to validate its proper distribution.

Another large benefit of promoting electric vehicles 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.

Lastly, it is important to consider the impacts of requirements for electric vehicle usage in TNCs on low-income drivers. The expectation that low-income drivers will purchase electric vehicles is likely unrealistic—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. For example, rental business models such as Maven have already demonstrated a use-case that can fulfill electrification goals. 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.

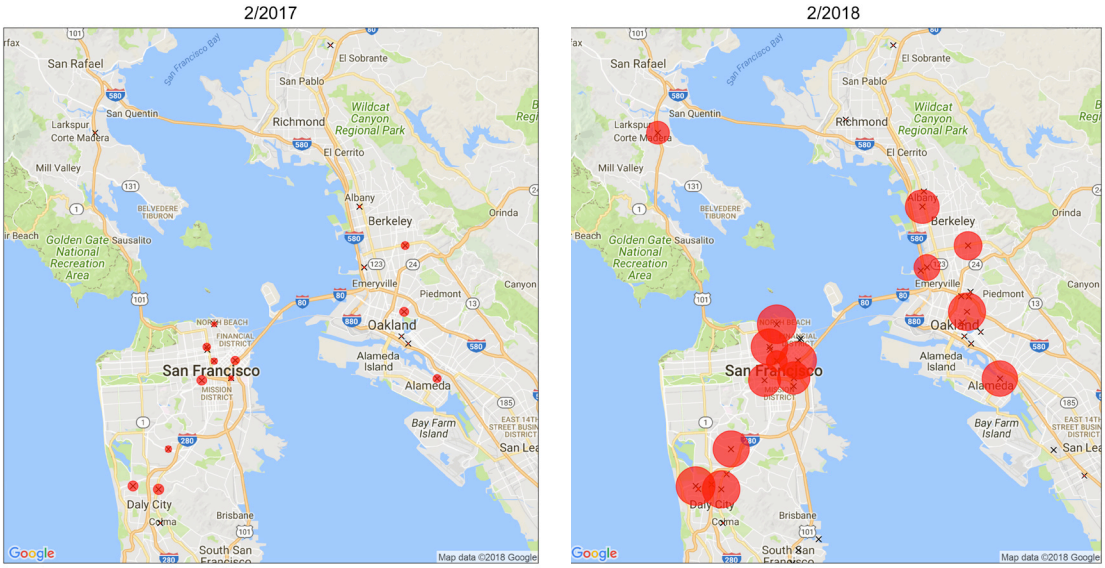

Figure 2: Growth of DC fast charger usage by Maven in one year: Feb 2017 compared to Feb 2018 (max dot size is 10MWh).