Docket Log: 13-ALT-02

Submitter: Electric Power Research Institute

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To:

California Energy Commission

Dockets Office, MS-4

Re: Docket No. 13-ALT-2

1516 Ninth Street

Sacramento, CA 95814-5512

Subject: 2014-2015 Investment Plan Update

The EPRI Red Line/Blue Line model is based off of the 2009 NHTS, which is the default for modeling US driving behavior. Our model has three different types of results for both workplace and commercial. Our results assume that home charging is the default and everything else is a back-up. The three main levels our results fall into are listed below:

- Not-Benefits Tested/Free Charging: This output assumes that a vehicle parks at a charger wherever they park (work, grocery store, doctors office, etc.) and stay at the charger the entire time they are parked there. This is important because it assumes that even if the vehicle has 99% of the battery full, it would still charge there and continue to occupy the charger regardless of whether or not it is charging. For example, at the workplace, you would not allow someone to use the charger after lunch, instead the car would continue to use the charger throughout the day, regardless of need or whether or not it was actually charging.
- Benefits Tested: The benefits tested case assumes that the vehicle only charges and occupies a charger as long as it needs to charge to increase electric miles throughout the day. In the past we have explained that maybe the charger is placed in an inconvenient part of the parking lot, or you have to pay to use the charger. This is likely the number of EVSEs required, assuming optimal placement. This case also assumes that once a vehicle arrives at a charger, if the benefits test is passed, it stays at the charger for the rest of the day.
- Shared Charger: The shared charger case makes the most sense for long dwell time charging, such as at the workplace. In this scenario, we assume that the vehicle pulls up to a charger regardless of need, but as soon as they are done charging, someone else may use the charger. If we consider the workplace charging scenario from the “Non-Benefits Tested” case, it would allow someone to use the same charger after lunch.

EPRI believes that the benefits tested version is most likely needed and optimal in the near-term. Our estimates for the state of California are based off of these numbers, assuming optimal placement, which will only occur in a more mature market.

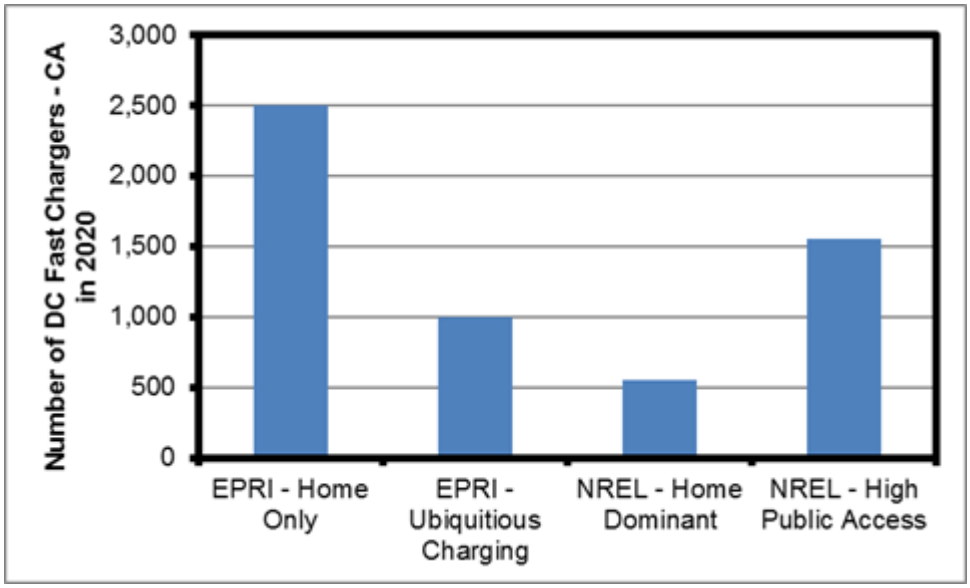
The NREL approach has two different cases, with explanations below:

- Home Dominant: Most charging occurs at home, with some at away from home locations
- High Public Access: This is considered a high scenario, but one which may be useful for drivers who do not have home charging, or in multi-unit dwellings.

While EPRI does not agree with the methodology performed by NREL to arrive at their conclusions, the results are similar enough that it makes little difference. In particular, the assumptions that NREL makes on the way people will use PEVs, the vehicle assumptions, and charging assumptions are relatively pessimistic and not representative of real-world driving, from what we have seen.

One major difference between the NREL results and EPRI results is the lack of emphasis on workplace charging. EPRI believes that workplace charging is very crucial to PEV adoption and success especially in the near-term. Workplace charging that is free, in our experience, has been optimized more towards the shared charger case, where employees will move their vehicles at lunch. We recommend focusing on workplace charging in the future, more so than the NREL results imply. Some of this may be Level 1, and should be optimized based on usage and the fact that workplace is often a long dwell location, as previous EPRI research has shown.

For fast charging, our methodologies and assumptions are different enough that our conclusions are opposite. NREL assumes that residential charging is limited in their high-public access scenario, which is the opposite of what EPRI models. The results are shown below in Figure 2.



In general, the NREL results are not different enough from the EPRI results to matter much. Both of our models assume ideally placed chargers. One major difference, is that much of their paper suggests that

Level 1 is sufficient (and often it is) but the cost to install Level 2 is not much greater (if at all) than Level 1, and as such we suggest installing Level 2 EVSEs.

However, our recommendations moving forward are as follows:

- Publically-funded projects should be required to provide utilization data to a wide (but potentially disclosure-limited) set of researchers. Currently the limited data availability on the real demand for EVSEs and DC Fast Chargers is a key impediment to improving models. For example, we believe that the demand for DC Fast Chargers is underestimated by current models, but without data on usage there is a tremendous gap between estimates from demand-based modeling and supply-based modeling.
- Current business models appear to be failing to adequately supply charging to residents of MUDs. Overcoming this hurdle should be a policy and research focus, including allowing increased participation by utilities.
- EVSE utilization at high-capacity locations with many EVSEs should be analyzed in more detail. These locations have many EVSEs and many PEVs, with potentially multiple PEVs sharing an EVSE throughout the day. These sites have the highest capability for installed cost optimization and particularly the highest opportunity for utilization of the L1 EVSEs recommended in the report, so it will be important to understand how these sites can best be designed and expanded over time as the demand for charging increases.