Technology Advisory

Rate Options To Support EV Programs

What has changed?

The wise use of electricity, *Beneficial Electrification*, has sparked widespread re-thinking of policies that encourage or mandate less electricity use across the board. Advancements in electric technologies continue to create new opportunities to use electricity as a substitute for on-site fossil fuels like natural gas, propane, gasoline and fuel oil, with increased efficiency and control while also meeting environmental goals. It also offers local economic development opportunities and enhances the quality of the product used by the customer.

One area in which there is currently increasing opportunity for beneficial electrification is electric vehicles (EVs). Consumer perceptions of EVs are steadily changing. As prices decline and auto manufacturers offer more models, buying an electric vehicle may become more attractive to the average consumer.

Aside from the barriers of vehicle cost, availability, and service, for some consumers, one of the obstacles to adoption of the technology has been *range anxiety*, the fear that the vehicle simply won't have the range necessary to go places and do the things the consumer expects to do in a vehicle. For more information on this topic, see our related advisory: *Alleviating Misconceptions about Electric Vehicles*.

Typically in a normal product life cycle, after the early adoption phase turns into wider acceptance and market maturity, prices typically decline and availability/service expands. Eventually, electric vehicles will become a viable option for many car buyers.

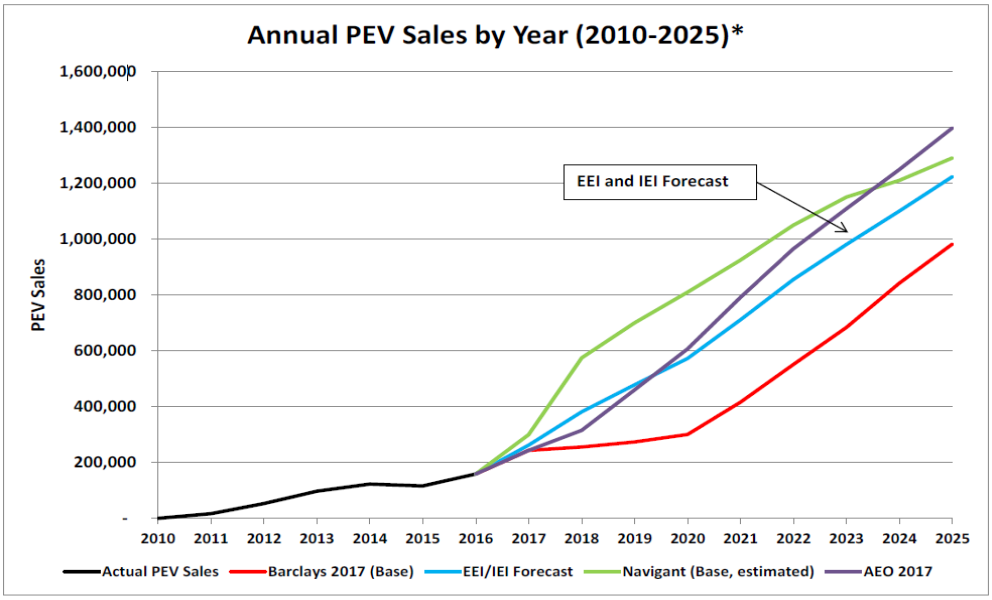
Auto manufacturers are taking note of changing perceptions and according to James Dunckley of EPRI, there will be 32 EV models on the market in 2019, and he predicts that there will be an EV alternative for every driving need in the near future[1]. To underscore the extent to which manufacturers are targeting every transportation need, Tesla is introducing a semi[2] for freight hauling… an all-electric 18-wheeler.

Further, the Edison Electric Institute (EEI) forecasts that there will be 7 million[3] EVs on the roads by 2025, up from 567,000 in 2016. To support this number of EVs, there will need to be emphasis placed on residential, workplace, and strategic public charging infrastructure to support the surge in EVs on the roads. This represents a significant

[1] https://www.utilitydive.com/news/time-of-use-rates-can-manage-ev-charging-new-report-says/515284/
[2] https://www.tesla.com/semi
[3] https://www.utilitydive.com/news/eei-7-million-electric-vehicles-could-hit-the-road-by-2025/446141/

infrastructure investment. Auto analysts predict that by 2025, EVs will account for 5 to 20 percent of new car sales.

Figure 1: EEI/IEI Annual PEV Sales Forecast Compared to Selected Forecasts[4]



*Includes battery electric vehicles and plug-in hybrid electric vehicles

What is the impact on cooperatives?

EVs represent an opportunity to grow electric load while decreasing a car's total emissions. For the vast majority of people, EV charging will be able to take place at night, which will allow them to use cheap off peak electricity. Whether viewed as a static device connected to the lines or as an asset in an advanced distributed energy resource management system, certain cooperatives, especially the ones with suburban members or members with high disposable incomes, should be prepared to accommodate the natural growth of EVs. This growth may be clustered along certain feeders, bringing with them the potential for facility capacity and overloading.

What do cooperatives need to know or do about it?

Beneficial electrification strengthens the cooperative presence in the community and offers benefits to the electric system. Given the potential for a positive impact on electric utility load factors available with electric vehicles, a proactive approach by the co-op seems prudent. The proper rate incentives can help the co-op keep the charging

4 http://www.edisonfoundation.net/iei/publications/Documents/IEI_EEI%20PEV%20Sales%20and%20Infrastructure%20thru%202025_FINAL%20(2).pdf

cycle off peak, taking maximum advantage of lower cost power while building load in a beneficial manner.

Rate Drivers

The drivers behind the specifics of an EV rate are determined in large part by how the cooperative views the EV and its charger in terms of how they can be integrated into cooperative operations. There are generally four broad categories, or use cases, of treatment:

1. **Business as Usual** - View the EV/charger simply as a new load just as they would the addition of an air conditioner or pool pump to an existing residence or commercial member.
    a. **Optional rate – standard residential service**
2. **Potential Peak Impact** - View the EV/charger as a load to move onto low demand periods to mitigate the impact on peak demand and the associated charges.
    a. Additionally, they would need to develop, repurpose, or use an existing rate. Research is showing that traditional time of use rates are or can be adequate incentive to move charging off peak.
    b. This use case relies on members voluntarily adhering to the time periods of the rate so does not prevent on-peak charging.
    c. **Optional rate – standard residential TOU service**
3. **Keep the Load Off Peak** - View the EV/charger as a load that has a detrimental impact on peak demand and, therefore, may need to be incentivized accordingly.
    a. In this use case, existing rates may be used/repurposed or a new rate developed.
    b. Load control programs and incentives will need to be modified to accommodate the new asset.
    c. Work will need to be done with the G&T to determine the acceptability of the EV/charger as a DR asset.
    d. Regulatory approval may be a requirement.
    e. Treat DR/Load Management asset by turning them on and off.
    f. **Optional rate – standard load management/demand response rate**
4. **Manage as a Distributed Energy Resource (DER)** - View the EV/charger as an asset to build revenues beyond simple load growth.

a. This use case is, admittedly, in its infancy as many pieces must come together. However, the co-op will need appropriate rate structures, processes, and procedures to:
    i. Identify and engage for aggregation.
    ii. Work with G&T and regulators to accept DER aggregation and dispatch as a service.
    iii. Determine the ancillary services possible from the DERS, which may include the following depending upon the actual DER mix:
        1. scheduling and dispatch
        2. reactive power and voltage control
        3. loss compensation
        4. load following
        5. system protection
        6. energy imbalance
        7. load reduction
        8. rapid energy provision

b. Optional rate – standard load management/demand response rate

Conclusion

From a rate and beneficial electrification perspective, managing the impacts and contributions of EVs and their chargers needn't be any more complex than a judicious application of existing rates. When it comes to use case 4, treatment of these assets as distributed energy resources, more work is required. In the meantime, co-ops whose geographic and demographic characteristics favor adoption of EVs have the opportunity to plan for rate structures and programs that support EVs and the potential benefits they bring to the cooperative community.

Want to add to your experience and knowledge?

A survey is available online here: https://www.surveymonkey.com/r/79KTDKT . If you use the paper version, please send it to Allison Hamilton when complete:

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All survey responses are confidential. No data that clearly identifies an individual cooperative with be communicated in any context without that cooperative's express permission.

Additional Resources

- Advisory: Electric Vehicle Market Potential
- Beneficial Electrification article series
- Advisory: Electric Vehicles – New Models Poised to Make a Splash
- Advisory: Alleviating Misconceptions about Electric Vehicles

Contact for More Information

For more information, please contact Allison Hamilton, Senior Principal – Markets & Rates, at Allison.Hamilton@nreca.coop