



## State Commission Staff Surge Call: Electric Vehicles

June 25, 2018

The electric vehicle (EV) market has expanded rapidly, particularly as vehicle manufacturers begin to make a broader variety of EVs at cheaper prices, and with longer ranges. States have implemented various policies to help grow the EV market, such as EV goals, tax credits, waived registration fees, sales tax exemptions, high-occupancy vehicle (HOV) lane access, and the purchase of EVs for state fleets or public transportation. In 2017, 200,000 EVs were sold in the U.S., making transportation electrification no longer a question of "if," but "when."

State public utility commissions have now begun to shape the future of EVs, looking for opportunities to make EV charging an asset to the grid. In states with high renewable penetrations, excess electricity during low demand periods in the middle of the day or overnight offer attractive EV charging times. Commissions are also considering infrastructure deployment: where to place EV chargers, how to design rates for public charging, and who should own or operate the infrastructure. Commissions are beginning to use pilot programs to experiment with different rate structures and infrastructure deployment strategies. On this call, staff from California, Georgia, Massachusetts, and Michigan shared how their Commissions are approaching EVs.

### California

California is on the leading edge of EV adoption. The state's history of implementing stringent mobile source emissions regulations created an early market for zero-emission vehicles (ZEVs), including EVs and hydrogen fuel cell vehicles. Governor Jerry Brown issued an [executive order](#) in January 2018 setting a goal to bring five million ZEVs and 250,000 charging stations online by 2030 and 2025, respectively. In response to the governor's ambitious goals, the Commission held a [forum to discuss goals for ZEV rate design](#) on June 7 – 8, 2018. The Commission wants to ensure that charging behavior benefits the grid by integrating renewables, which can oversupply electricity at periods of weak demand overnight or midday.

California utilities have begun a handful of pilot programs to experiment with different price signals. One program offered transit agencies the option to waive demand charges for up to three years while adopting electric buses. This grace period let agencies understand how to operate electric buses and come up with charging schedules to mitigate demand charges after three years.

In May, the Commission approved a [Southern California Edison rate](#) for commercial customers giving them a five-year period of energy-only volumetric rates, with demand charges phased in gradually starting at year six. Similar to the electric bus pilot, SCE aimed to let customers adjust to EV charging, understand their electricity bills, and modify their behavior to respond to SCE's price signals.

California's pilots show the importance of giving customers a chance to learn what owning and operating an EV entails before moving them onto a new rate. These programs are designed to test whether customers are more likely to adopt electric vehicles if they have an opportunity to identify and change their charging behavior while new rates are phased in over time. The Commission will monitor the progress of these pilot programs to inform future rate design efforts.



## Georgia

In 1998, the Georgia legislature passed a \$5,000 state tax credit for EVs, leading to quick adoption and eventually ranking Georgia as the second state in the country for EV ownership. However, in 2015, the legislature reversed course by canceling the tax credit and adding a \$200 EV registration fee, the highest in the country. The legislature justified the higher registration fee by pointing out that EVs do not pay gas taxes, thereby failing to provide the state with revenue to build and repair roads. In response, EV sales fell from 300 per month prior to 2015 to 150 per month currently.

However, the Commission is still engaging with Georgia Power and other stakeholders. In 2014, the utility filed a pilot program for EV infrastructure and educational awareness. The program spent \$10.4 million on educational resources and incentives for residential and workplace chargers. Georgia Power also used the program to fund 37 public fast charging stations. Commission staff was concerned about the high costs and lower estimated benefits of the program and reviewed data suggesting the program was failing to meet the ratepayer impact measure (RIM) test. In both the 2016 and 2017 [Annual Surveillance Reports](#), the Commission removed the program's costs from Georgia Power's recoverable rate base. Cost recovery for this program will likely be revisited in the upcoming 2019 Georgia Power rate case.

Georgia Power was granted approval of a [time-of-use \(TOU\) rate](#) plug-in electric vehicle tariff for residential customers in 2013, and users are required to have a separately metered dwelling to be eligible. The rate includes a \$10 base charge with three different rates: a peak rate of \$0.203/kWh between 2 pm and 7 pm during weekdays from June to September, an off-peak rate of \$0.066/kWh during daytime hours not included in the peak period, and a super-off-peak of \$0.014/kWh between 11 pm and 7 am year-round. The rate has been successful in shifting usage out of peak periods, with an average savings of \$180 per year per customer. More than 3,000 customers are currently enrolled and a customer is not required to own an electric vehicle to be eligible for the rate.

Georgia's experience shows that even when EV growth is low, Commissions can prepare for future EV adoption by instituting smart rate designs and monitoring their results. Further, Commissions can hold utilities responsible for delivering adequate benefits from ratepayer-funded pilot programs. Utilities need to collect adequate data to ensure that ratepayer money is delivering broad benefits.

## Massachusetts

Massachusetts has taken an active approach towards promoting the spread and adoption of EVs, with a recent executive order calling for 300,000 EVs on the road by 2025. To facilitate this, the Massachusetts Department of Energy Resources is running the MOR-EV incentive program. In 2013, the Commission instituted docket 13-182 to call for EV pilot programs and cost recovery options.

Since then, there have been two different versions of pilots for installation of charging stations. One was through a rate case, in which the infrastructure leading up to the charging station is owned and operated by the utility, with the utility not excluded from bidding on the charging station itself at a later date. The other was through proposed incentives to bring down the costs of panels and wiring, with the utility not owning and operating equipment.

A recent grid modernization order did not tackle TOU rates. However, the Commission noted that special TOU rates for EVs were called out as a forthcoming focus and expects action in the near future. The Commission acknowledges that the state's climate provides several issues with setting up rate design for



EVs. Massachusetts has experienced electrical supply issues related to usage, with sharp summer peaks and shortages during the winter. These winter shortages are the main reason why the Commission anticipates an atypical rate design that may not follow the models seen in other states.

Other issues related to EV adoption in Massachusetts are being raised by the executive branch of the state government. As EV adoption increases, gas tax revenues will fall, leading to a potential shortage of funding for maintenance on public roads and infrastructure. This is difficult for the Commission to solve, as it is not a normal concern for utility regulation. Charging infrastructure is another concern, with the executive branch conducting town halls across the state. Currently, the Commission is struggling on how and where to install chargers, with priority going to "logical public spaces" such as commuter rail stations that could facilitate broader EV deployment rather than areas that could be potentially more affluent which may already be seeing higher EV adoption. The Commission continues to research the best methods to roll out charging stations in a way that benefits the greatest number of people, and notes both of these proposals are limited in length, with evaluations directed to better inform future decisions.

### **Michigan**

Michigan first started addressing EVs in 2008, when the Commission issued a \$5 million grant to study issues related to plug-in vehicles. This grant had five main components: technology, environmental effects, grid impacts, ancillary services to the wholesale market, and metering and TOU pricing policies. The Commission has learned that all five of these issues are as relevant now as they were ten years ago.

As a result of the 2008 Study, the Commission learned that clusters of PEVs can have adverse impacts on the distribution system, specifically transformers. The study found that on-peak overloads of these transformers significantly increased at just 10% PEV adoption, with off-peak overloads occurring at 25% when looking at 7.2-kW level 2 charging. The study recommended for utilities to actively manage EV charging so that the majority occurs at home, preferably after midnight.

The state has also created the Michigan PEV Task Force to remove barriers for EV adoption, with emphasis on changing the electric code so that separately metered circuits for EV charging would be allowed. Utilities were also asked to come up with experimental EV rates with three components: putting the whole house on a TOU rate; an experimental PEV TOU rate using the same rate schedule with dual meters; and finally an experimental EV monthly flat rate (with an additional meter only required for monitoring purposes). Utilities filed such EV rates in 2010. For example, DTE Electric filed a D1.9 EV rate, with on-peak charging at \$0.18/kWh and off-peak at \$0.08/kWh, along with a flat fee of \$40/month limited to the first 250 customers. Customers that enrolled in the Schedule D1.9 qualified for up to \$2,500 toward Level 2 charging infrastructure, with the cost of the rebates recovered in the revenues received from these rates. DTE's [D1.9 rate](#) has evolved over the years and is currently set at \$0.22/kWh for on-peak charging and \$0.10/kWh for off-peak charging, with on-peak between 9 am and 11 pm weekdays. The flat rate option is currently \$46.39 per month. The rate remains available to the first 5,000 customers, although the rebate has expired. DTE's 2017 data showed that rate design heavily influenced charging behavior: flat rates meant that most customers charged during peak times, while under TOU rates, the majority of charging took place off-peak.

Three technical conferences held by the Commission in 2017 and 2018 with industry leaders and EV manufacturers concluded that utilities should request EV pilots in upcoming rate cases with four main focuses: education, infrastructure deployment, grid impact, and rate design. Rate cases have further



emphasized to the Commission that TOU rates are critical to ensure maximum benefits behind EV adoption, with Consumers Energy asking for a \$12 million PEV pilot this past May, estimating a net benefit of \$1,900 – 2,300 per EV assuming 70 – 85% off-peak charging. The utility requested a three-part dynamic pricing mechanism called the "Residential Nighttime Savers Rate," in which a customer receives a \$500 rebate toward a level 2 charger upon enrolling, in exchange for participating in a load control program that includes a critical-peak rebate of \$0.95/kWh independent of TOU rates. Rates for on-peak use would be \$0.20/kWh, off-peak \$0.165/kWh, and super off-peak \$0.132/kWh. For context, off-peak customers with a Chevrolet Volt would be able to pay \$1.70 for a full charge. The Commission notes that DTE is expected to file for a similar pilot intended to collect data to shape future rate designs.

### Discussion

Georgia and Massachusetts staff brought up the question of how to structure gas taxes and vehicle registration fees to account for EVs' usage of public infrastructure. Already, gas taxes fail to provide adequate revenue to fund road repairs and other projects in many states. As more vehicles switch from gas to electric, revenues will fall even further. Oregon's Department of Transportation [recommended](#) a "road usage charge" in 2017 that would assess a charge on vehicle miles traveled on public roads, eventually expanding the program to 5,000 participants. Other states have begun to consider alternative gas tax designs, but there have been few decisions to date, and Commissions are typically not involved.

Other staff on the call noted that rate design is a difficult issue for states. Commissions may be cautious to make such a substantial change to how ratepayers pay for electricity, even if it may save them money in the long run. Any changes to rate structures require education and outreach to ensure that ratepayers understand the new rates and have the ability to change their consumption behavior to respond to new signals. Early pilot programs indicate that TOU rates and demand charges can be effective in pushing EV charging from peak to off-peak periods, making EVs a benefit to the grid. However, these pilot programs are mostly optional for customers. Results in the broader ratepayer population remain to be seen.

Regarding infrastructure ownership, states had different perspectives. Massachusetts aims to incentivize development by enabling competitive bidding on charging sites. Michigan offers rebates for residential chargers to cover connection costs. Georgia has focused on workplace incentives to target multiple EV owners. California has been testing different ownership models, setting limits on rebates and rewarding investment in disadvantaged areas. All four states are attempting to understand how much public funding is needed to develop adequate charging infrastructure, and what can be left for the market to provide.

Commissions also need to evaluate pilot programs. California's Commission directs utilities to collect data and sets aside funding for an independent evaluator. Massachusetts has similarly reserved funding for independent evaluation. Georgia brought up lessons learned from successful energy efficiency programs: third parties can often run marketing and rebate programs more effectively than utilities or state government, maximizing participation while minimizing costs.

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