

**COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES**

Investigation by the Department of Public Utilities
on its own Motion into Electric Vehicles
and Electric Vehicle Charging

D.P.U. 13-182

COMMENTS OF ACADIA CENTER

Acadia Center¹ appreciates the opportunity to provide comments to the Department of Public Utilities (“Department”) in Docket 13-182, Investigation by the Department of Public Utilities upon its own Motion into Electric Vehicles and Electric Vehicle Charging. Acadia Center is a non-profit research and advocacy organization committed to advancing the clean energy future. These comments address the questions raised in the Memorandum issued by the Department of Public Utilities (“Department”) on November 19, 2014.

This request for comments is taking place in the context of many other proceedings, including Docket 12-76 on Grid Modernization, the Massachusetts Electric Vehicle Initiative Task Force (“MEVI Task Force”), and inter-state agreements on electric vehicles (“EVs”) and other zero-emissions vehicles. In particular, Massachusetts is a party to the Memorandum of Understanding on State Zero-Emission Vehicle Programs² and the Multi-State ZEV Action Plan.³ Acadia Center has participated extensively in the deliberations of the MEVI Task Force, the Grid Modernization proceeding, and the previous round of comments in Docket 13-182. As explained in detail below, we recommend the following:

- There is a wide range of information about EV charging that could aid distribution company planning. At a minimum, disclosure of vehicle registry information with appropriate privacy protections should take place either informally or put into statute. Disclosure of significant EV charging installations could be addressed in electric tariffs but may be more desirable to put into statute.
- NSTAR Electric’s EV pilot program should not be offered to all customers at this time. The Department should order the creation of a simultaneous pilot on residential EV-specific

¹ **Note change of name:** As of October 30, 2014, ENE (Environment Northeast) is now Acadia Center. To more accurately reflect the organization’s geographic scope and evolving approach, we are excited to announce the adoption of a new name, logo and website (www.acadiacenter.org). Our team, goals and commitment to results have not changed.

² http://www.arb.ca.gov/newsrel/2013/8s_zev_mou.pdf

³ <http://governor.maryland.gov/documents/MultiStateZEVActionPlan.pdf>

time-of-use rates and direct each distribution company to lay out options for a whole-house time-of-use rate offering. If the pilots are conducted expeditiously, the Department should be able to decide what combination of programs should be made available to all customers in late 2015 or early 2016. This more general offering should serve both as an incentive for EV adoption and as an incentive for EV owners to charge at times when impact on the grid will be low.

- The Department should adopt a rate pilot to reform demand charges for DC fast chargers similar to the Connecticut Light and Power pilot approved in June 2014, with consideration of alterations to prevent unreasonable cross-subsidization. This will make investment in the critical network of public DC fast charging economically feasible in the short term, and allow for the collection of data to consider broader reforms, such as a designated rate class for DC fast chargers.
- The Department should conduct a study on vehicle-grid integration and lay out a roadmap on long-term policy choices, either independently or in conjunction with the Department of Energy Resources.

Adoption of these recommendations would remove major roadblocks to widespread EV adoption and lay the groundwork for optimizing the system impacts of electric vehicles in the long run.

I. Distribution System Impacts

Question 1 – Role of Department

The Department should undertake a range of measures to optimize the impacts of electric vehicles on the distribution grid and the broader electric system. The specific proposals in response to Question 2 on information gathering and Question 11 on EV rates, as well as the currently planned NSTAR pilot on managed charging, are all initial steps in this direction. As technology advances, more complex options will be available to use EVs as a mobile storage resource for the grid. The Department, either independently or in conjunction with the Department of Energy Resources (DOER), should conduct a

study on the broader questions here, often collectively referred to as “vehicle-grid integration”, and lay out a roadmap on long-term policy choices. Previous reports done in California⁴ and Vermont⁵ can serve as a starting point for these efforts.

Question 2 – Information on EV Charging

There is a wide range of information that can help the utilities plan and provide for proper integration of electric vehicle charging into the grid. Disclosure from the Registry of Motor Vehicles to the utilities could be facilitated by the Department, DOER, and the Executive Office of Energy and Environmental Affairs, or could be put formally into statute. Privacy protections, such as those in California, should be put in place with exceptions to communicate about EV-specific program offerings. The utilities, with the supervision of the Department, could also put notification requirements into electricity tariffs. However, these may be difficult to enforce without reasonable efforts to publicize the requirements in advance. This may be appropriate only for major charging infrastructure installations, defined appropriately in terms of the size of the circuit in amperes required for the equipment or the peak power draw of the equipment in kW. Such a measure may also be more appropriate to include in a statute as permitting requirement for the electrical installation or a requirement that retailers of charging infrastructure notify customers of the need to alert their local utility.

Question 3 – Cost Allocation Methods

In general, system upgrades required for EV charging infrastructure should be treated the same as other incremental types of load, such as hot tubs or air conditioners, in terms of cost recovery and any special charges.

Question 4 – NSTAR EV Pilot Program

It would be premature to offer NSTAR’s EV pilot program to all customers at this time. This pilot, and any simultaneous pilots on EV rates as discussed below, should be completed expeditiously so the

⁴ <http://www.caiso.com/informed/Pages/CleanGrid/VehicletoGridRoadmap.aspx>

⁵ <http://www.veic.org/documents/default-source/resources/reports/evt-rd-electric-vehicles-grid-resource-final-report.pdf>

Department can determine the optimal programs to offer on a more permanent basis starting in late 2015 or early 2016.

II. EV Rates Policy

Question 5 – EV-specific Rates

An EV-specific, time-of-use rate tied to a second meter or other measurement device avoids the need for an EV owner to make a more complicated calculation about their other electricity use patterns and whether they would benefit overall from a time-of-use rate. Acadia Center supports the approach laid out by the Department in the Time-Varying Rates docket and the Grid Modernization docket to move to an opt-out, time-of-use rate structure in the long-term once advanced metering functionalities are available. In contrast to that structure, *opt-in*, whole-house, time-of-use rates may be a serious barrier to uptake of an economically justified program to increase adoption of electric vehicles. It may take many years for basic service to have an opt-out, whole-house, time-of-use rate –full roll-out of advanced metering under the directives from the Grid Modernization docket may take until 2021. We need to create options that electric vehicles owners will take advantage of in the near term.

In addition, EV-specific time-of-use rates would not cause any cross-subsidization. To the contrary, properly designed time-of-use rates *decrease* cross-subsidization. However, sharing of any incremental administrative costs due to the program is a legitimate issue where there are a number of options that should be discussed.

Question 6 – Other Metering Options

No response at this time.

Question 7 – Rate Design as an EV Incentive

For the residential market, a properly designed, EV-specific, time-of-use rate or a demand-response/managed-charging incentive similar to the one included the current NSTAR pilot should serve as a reasonable incentive for EV adoption. Such a program should incorporate the benefits of shifting

load on all portions of the electricity bill. The additional details of the rate or the demand response program will be important to determine whether it is a sufficient incentive and should be considered carefully. For workplace charging, and commercial and industrial customers more generally, level one and level two charging do not necessarily face any significant obstacles from current rate designs and, beyond the below proposal for public DC fast charging, Acadia Center does not have any additional suggestions for reforms to commercial and industrial rates at the present time.

Question 8 – Optional Residential Time-of-Use Rate

No response at this time.

Question 9 – Time-of-Use Basic Service Component

No response at this time.

Question 10 – Distribution Company Incentives

Currently, the distribution companies do not have a significant incentive to promote adoption of EVs. In the short run, decoupling may prevent additional profits due to the new load, although increasing billing determinants do help keep rates low, a perennial concern of the utilities. In the long run, there may be broader benefits to a distribution company to the additional load and may allay fears of the so-called “death spiral.” However, the grid modernization planning process offers an opportunity for the Department to incentivize the distribution companies to promote EVs. In particular, performance metrics established by that process could point the utilities in the right direction. EV-specific metrics could be desirable but more general metrics – such as a metric for increasing the grid utilization factor where EVs serve as a mobile storage resource – could be effective as well.

Question 11 – Rate Design Recommendations

The Department should direct the utilities conduct an EV-specific, time-of-use rate pilot to compare with the NSTAR managed charging pilot and to make a filing to revise their offerings for whole-house, time-of-use rates. It is possible that the demand response technology may be especially effective when combined with a time-of-use rate.

III. Demand Charge Policy

Question 12 – Distribution Demand Charges as a Barrier

DC fast charging stations provide, as the name suggests, one of the fastest and most convenient ways to recharge an electric vehicle – refueling about 80% of an EV battery’s capacity in thirty minutes or less. With this capability, public DC charging stations are especially useful for serving EV refueling needs along major driving routes in Massachusetts, such as the Mass Pike and Interstate Highway 95. Such a public backbone of DC fast charging stations helps address a major barrier to EV adoption by consumers, namely range anxiety, which is the concern that EV owners will not be able to re-charge while traveling to their normal destinations or that they could be stranded with an inoperable vehicle if the vehicle’s charge is fully consumed. Furthermore, EV owners understandably want the option of fast refueling for long-distance travel within Massachusetts and driving across New England.

Demand charges represent a significant barrier for DC fast charging. As demonstrated in Docket 13-12-11 at the Connecticut Public Utilities Regulatory Authority, typical demand charge structures severely penalize customers who have low utilization rates. In that proceeding, it was shown that customers with low utilization rates could face an effective price per kWh over \$1. It is not until the utilization rate for such a customer hits a typical level, around 40%, that the effective price per kWh drops within the range of “normal” electricity rates. This presents a serious business case problem for public DC fast charging. A \$1 per kWh rate would be completely uncompetitive compared to charging at home with residential rates; would discourage, if not eliminate completely, private investment in DC fast chargers; and, eliminates one of the key consumer benefits of EVs – low fuel costs compared to gasoline. Addressing these problems with rates is important, because we cannot eliminate several major hurdles to widespread EV adoption until we have a DC fast charging network as a resource for potential EV owners.

The structure of the rate classes that would currently apply to a public DC fast charger here in Massachusetts likely represents an even bigger challenge to the business model for DC fast charging than

in Connecticut or other locations across the country. The current NSTAR G-2 tariff, with demand charges, for kW over 10, at \$16.47 per kW in the winter and at \$38.88 per kW in the summer and declining block per-kWh rates is almost literally designed to punish customers with the type of load profile initially expected for public DC fast charging stations.

Question 13 – Proposal to Change Distribution Rates

Reasonable reforms to the demand charge structure that would currently apply to a public DC fast charger are very necessary. In the longer term, broader reforms should be considered, such as a new rate class for DC fast charging stations that is significantly different than the current general service rates that would apply. However, shorter term reforms are also necessary, particularly because of the planned DOER program for DC fast charging in the near future.

In Connecticut, the Connecticut Light and Power Company has adopted a reasonable solution to this problem. The Electric Vehicle Rate Rider Pilot, approved on June 6, 2014 in the attached decision, converted the applicable demand charges for each customer class to reasonable per-kWh rates based on the average capacity factor for that same class. This meant that an overall demand charge of around \$13 per kW is converted to a per-kWh charge of 4.5 cents, significantly improving the economics of a public DC fast charger in its initial years.

Details of that pilot can be altered for use in Massachusetts to ensure that other ratepayers will not be overly burdened with costs. Notably, a contribution-in-aid-of-construction (CIAC) formula could be used in this context. This ensures that, if a fast charger requires extensive upgrades for electricity service, the owner of the fast charger has to cover incremental costs that will not come from their expected contribution through distribution rates. In addition to addressing the cross-subsidization issues, adopting a CIAC will incentivize placement of fast chargers in areas where there is sufficient service capacity. The assumed capacity factor for conversion from a demand charge to a per-kWh charge could be altered also. Such a pilot in Massachusetts could help determine what measures to take in the long run, such as the design of a new rate class for DC fast chargers.

Question 14 – Interruptible versus Non-Interruptible C&I Customers

No response at this time.

Question 15 – Alternative Mechanisms

There are broader reforms that could be undertaken, such as a special DC fast charger rate class. However, a pilot program like the CL&P is necessary and appropriate in the short term to address the existing problem.

Question 16 – Suspension of Demand Charges

It is reasonable to assume that suspension of demand charges would encourage a faster build-out of charging infrastructure. However, the alternative proposed above could shield DC fast chargers from exorbitant electricity bills without shifting any significant costs to other retail customers.

Question 17 – Demand Charges for Residential Customers

A rate design broadly applicable to all residential customers, or residential customers above a certain size threshold, could appropriately include demand charges, particularly those based upon the peaks in the system that drive costs. In theoretical terms, such a rate would be more economically justified than per-kWh rates currently used for distribution. However, significant practical questions exist in this area, such as whether average residential customers will be able to respond effectively to these economic incentives independently or with the aid of available energy management technologies. There are also related questions about residential customer acceptance of demand charges and how to transition effectively from current rate structures. However, special demand charges, akin to standby rates, should not be applied to customers who adopt particular technologies such as solar PV or electric vehicles.

Question 18 – Actions on Demand Charges

In the short term, the Department should adopt an EV fast charger rate pilot such as the Connecticut Light and Power pilot with appropriate alterations to prevent unreasonable cross-subsidization as discussed above. In the longer term, a new rate class for DC fast chargers should be considered.

IV. Lessons from Other Jurisdictions

Question 19, Part A – Distribution Impacts and Cost Allocation

No response at this time.

Question 19, Part B – EV and Time-of-Use Rates

No response at this time

Question 19, Part C – Demand Charges

See above responses to Questions 12 and 13.

Question 19, Part D – Equitable Access to Charging Infrastructure

No response at this time.

V. Other Issues

Question 20 – Other Issues

As discussed in response to Question 1, the Department, either independently or in conjunction with the Department of Energy Resources, should do a study on vehicle-grid integration along the lines of the reports done in California and Vermont.

Question 21 – Further Role for Distribution Companies

Additional investments by the distribution companies in this area, such as investments to enable functionalities related to EVs or investment in charging stations in underserved areas as allowed by Order 13-182-A, should be included as a part of the grid modernization plans required to be filed next year and the associated short term investment plans.

VI. Conclusion

Acadia Center greatly appreciates the opportunity to respond to the Department’s request for comments. We applaud the Department’s attention to these critical issues and proper action by the

Department will speed the adoption of electric vehicles and help the Commonwealth meet its economic and environmental goals.

Thank you for your consideration of these comments.

Respectfully submitted,

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