BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Electric Utility Rate Design for Electric Vehicle Charging	:	Docket No. M-2023-3040755

COMMENTS OF
MCR PERFORMANCE SOLUTIONS

I. INTRODUCTION

On October 19, 2023, the Pennsylvania Public Utility Commission ("Commission" or "PUC") adopted a proposed Electric Vehicle ("EV") Rate Design Policy Statement ("Policy Statement") in Docket No. M-2023-3040755. Interested parties were invited to file written comments within 30 days following the date of publication in the *Pennsylvania Bulletin*[1], which include, but were not limited to: key policy issues related to EV-charging rate tariffs, rate design, and rate equity for distribution services and default service generation. MCR Performance Solutions ("MCR") appreciates the opportunity to provide comments on the Policy Statement, especially given that these issues have already received extensive study by the PUC-convened EV Charging Rate Design Working Group, including a report containing 25 specific non-consensus recommendations. MCR supports the Policy Statement and offers comments on key policy issues for the Commission's consideration.

II. BACKGROUND

MCR Performance Solutions is a management consulting firm serving the utilities industry. MCR personnel have been active in the Commonwealth's regulatory environment for

[1] Pa. Bulletin Volume 53 Number 51, published on December 22, 2023

over four decades. For example, MCR has been an active participant in the Pennsylvania regulatory process for 15 years, primarily assisting Duquesne Light Company in its energy efficiency filings and programs. MCR is interested in supporting the utilities in the state of Pennsylvania to be well positioned to adopt industry best practices in EV rate design. MCR has researched and analyzed utility EV strategies throughout the United States, serving as an EV program planning witness in two states and developing granular EV adoption forecasts for an integrated resource planning stakeholder process in another. MCR is providing comments on four aspects of EV rates: time-of-use rates (including metering and bill credits), actively managed charging, public and third-party charging, and locational issues in EV charging.

EVs are being purchased at higher rates than ever before. In 2022, despite a drop in overall vehicle purchase sales, electric vehicles continued to expand their market share. Sales of EVs increased by 55% in 2022 compared to 2021 – 5.8% of total vehicle sales[2]. With a growth forecast of approximately 30% of total vehicle sales by 2030[3], it is wise to get ahead of the times and implement effective rate strategies to keep up with the associated infrastructure requirements.

In certain jurisdictions, EV adoption may be expedited by local laws and regulations established to meet carbon-emission goals. For example, in California, the California Air Resources Board adopted emission standards requiring all new passenger vehicles and light trucks to be EVs or PHEVs by 2035.[4] Infrastructure investments are inevitable given the International Energy Agency estimates that EV electricity demand will reach 153 TWh by 2030[5].

[2] https://thehill.com/policy/technology/3802179-us-electric-vehicle-sales-surge-in-2022-gain-on-tesla/
[3] https://evadoption.com/ev-sales/ev-sales-forecasts/
[4] https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/advanced-clean-cars-ii
[5] https://www.iea.org/data-and-statistics/charts/electricity-demand-from-the-electric-vehicle-fleet-by-country-and-region-2030

Infrastructure requirement timelines will vary by geographic location, but this is a question of when, not if, infrastructure investments will be required.

Pennsylvania is not immune to the phenomenon of EV adoption and emerging needs on the part of the electric system and has made great strides to embrace it. There have been 59,332 battery and 33,710 plug-in hybrid EVs registered in the Commonwealth as of October 2023.[6] The Pennsylvania Department of Transportation announced on September 21, 2023, that the federal government's National Electric Vehicle Infrastructure ("NEVI") program, in its first round of conditional awards, would fund a total of $35.8 million to 57 projects in 38 counties that will expand access to EV charging in Pennsylvania. In additional rounds of awards, NEVI is expected to fund over $171 million in Pennsylvania.[7] While NEVI focuses on interstate and other designated "EV charging corridors," utility coordination with the Pennsylvania Department of Transportation and active participation is imperative in planning for investment in more localized charging infrastructure. Therefore, we welcome the Policy Statement so that the Commonwealth and parties to EV energy and rate policy and regulation will have a consistent vision of how rates should be developed for this growing sector of customers.

III. COMMENTS

A. Time of Use Rates, Metering, and Bill Credits

MCR supports the Commission's development of a Policy Statement to encourage Pennsylvania utilities to consider variable rates for EV customers based on the time of day and the level of demand on the electric grid. Time-of-use ("TOU") rates are the most common approach to EV rate design. TOU rates in general have been in prominent use in the United

[6]https://files.dep.state.pa.us/Energy/OfficeofPollutionPrevention/StateEnergyProgram/DEPA/December_2023/DEPA_Coalition_Meeting_Slides_December_2023.pdf
[7] https://driveelectric.gov/news/nevi-progress-update

States for near half a century and are used throughout the country without a specific need for advanced "smart" meters (i.e., Automated Metering Infrastructure or "AMI"). In the last decade, many public utilities have begun to create EV-specific TOU tariffs to shift demand away from peak periods, such as the late afternoon when residential customers are getting home from work and may wish to immediately plug in their car.

Many of the EV-oriented TOU tariffs are whole-house programs. That is, despite requiring EV ownership to participate in these rates, the rates will apply to all usage in the house. These TOU rates tend to have 3 time periods: on-peak, off-peak, and super off-peak. Duquesne Light, as one example, has a WholeHome EV rate structured in this manner with the on-peak period from 1PM to 9PM at 13.41 cents per kWh and the super off-peak period from 11PM to 6AM at 7.34 cents per kWh. This is as opposed to its standard default service rate of 10.46 cents per kWh.[8] Duquesne Light's EV TOU rates only apply to the standard offer service rate, not distribution charges. PECO does not have a specific EV tariff but does have optional TOU generation rates with on-peak, off-peak, and super off-peak periods.[9]

Another example of whole-house TOU rates is Georgia Power's Plug-In Electric Vehicle Schedule which has a much greater ratio between the on-peak and super off-peak rates, in part because Georgia Power is a vertically integrated utility, recovering generation, transmission, and distribution costs within its energy charges. Geogia Power offers an on-peak period from 2PM to 7PM (Monday through Friday only) at 20.3217 cents per kWh and the super off-peak period from 11PM to 7AM (every day of the week) at only 1.4993 cents per kWh.[10]

[8] https://duquesnelight.com/energy-money-savings/electric-vehicles/wholehome-ev-rate#undefined
[9] https://www.puc.pa.gov/media/2280/peco-tou_ev-fc_presentation_ev_working_group021623.pdf
[10] https://www.georgiapower.com/content/dam/georgia-power/pdfs/electric-service-tariff-pdfs/TOU-PEV-9.pdf

Although data is limited due to the nascency of the EV market, available data shows that standard house load curves are very different from the load curves of homes with an EV. Therefore, house-specific and EV-specific usage should not be billed as if they follow the same temporal load patterns. A key challenge with whole house TOU rates for EV charging is the question of metering. Generally, utilities and regulators require "revenue grade meters," that is metering equipment that has been rigorously tested to ensure accuracy. To that end, most utilities that offer a TOU rate for EV charging require a second revenue grade utility meter for the specific circuit(s) that power the EV charger. The TOU rate customer's bill then either combines consumption and the time it occurred for the original whole house meter with the data for the EV charger meter(s) to arrive at the bill customers receive, or treats the primary whole house meter as the source of the consumption to be billed and then applies bill credits for the portion of consumption that the EV-specific meters indicate occurred at the targeted off-peak times. For example, Indiana Michigan Power Company offers a rate option that applies a per-kWh credit on the bill for all EV-specific usage during the overnight off-peak period.[11]

The primary alternative to requiring metering of EV chargers is to utilize the Wi-Fi capabilities of some chargers or EVs (sometimes referred to as "telematics") to transmit time and electrical consumption data to the utility. There are two concerns with this approach: 1) as stated above, utility billing usually requires revenue grade meters, and 2) the utility may not have the information technology structures to receive and manage such data. Although MCR sees emerging interest in loosening the requirement for revenue grade metering for purposes of billing to allow billing based on telematics, a more realistic solution is to use telematic data to enable utilities to bill based on a single whole house (revenue grade) meter but also provide bill credits

[11] https://www.indianamichiganpower.com/lib/docs/ratesandtariffs/Michigan/IMMITBBk17-2022-07-29.pdf

based on telematic data. As an example, Duke Energy-Florida offers customers a $10/month bill credit if they allow the company to track their charging data using telematics and only charge during their off-peak periods. The company allows up to two opt-out events each billing cycle allowing them to charge during on-peak periods.[12]

Another issue with EV charging data collection, whether through metering or telematics, is that there are cost and complexity issues related to requiring installation of the EV chargers, which often require a higher voltage circuit and may require an upgraded utility electrical service and electrical panel (i.e., 200-amp or higher). This is especially a concern from the perspective of equity, where lower income customers cannot typically afford such upgrades. However, this can be mitigated with incentive or rebate programs. El Paso Electric in New Mexico offers up to $2,300 for eligible low-income customers to purchase and install a smart Level 2 charger.[13]

A final issue with respect to TOU rates for EV charging is addressed, at least in part, by the Policy Statement's recognition that EV charging rates should be flexible and adaptable to changing circumstances and should be periodically reviewed and adjusted. The increasing prevalence of rooftop solar is one example of why flexibility and periodic review have merit. For example, the Public Service Company of New Mexico ("PNM") faces challenges with respect to its TOU rates as the use of solar power continues to increase in its service territory. In its most recent rate case, PNM noted that the increase in solar generation has shifted the times of system stress away from the heat of the day into the times after the sun has set. Therefore, PNM has proposed completely new time periods for on-peak, off-peak, and super off-peak usage, where the super off-peak is now in the middle of the day.[14] This may have the effect of making

[12] https://www.duke-energy.com/home/products/ev-complete/off-peak-credit
[13] https://www.epelectric.com/ev/?s=nm&l=en
[14] New Mexico Public Regulation Commission Docket No. 22-00270-UT

workplace charging (daytime) more financially attractive than home charging (nighttime). EV rates in place throughout the country already provide information on acceptance of and customer satisfaction with EV rates, but each service territory has its own nuances and each utility's needs will be different.

In all, MCR agrees with the Policy Statement that encourages Pennsylvania utilities to consider variable rates for EV customers based on the time of day and the level of demand on the electric grid, while maintaining that EV charging rates should be flexible and adaptable to changing circumstances and should be periodically reviewed and adjusted. MCR believes that the Policy Statement should also (a) encourage Pennsylvania utilities to investigate whether EV usage-specific rates would be an appropriate rate design in their service territory, using separate metering or telematics; and (b) consider bill credits in addition to charges for their variable rates.

B. Actively Managed Charging

In addition to encouraging TOU rates, the Policy Statement should also encourage other types of EV rate design. Although TOU rates are common and effective, they encourage customer-directed "passive" charge management. Some utilities are now offering "active" charge management programs and rates that, in some ways, resemble the types of air conditioning "cycling" programs, through which direct, remote actions by a utility cycle air conditioning equipment down or off for relatively brief amounts of time during periods of critically high electricity demand. Active charge (demand) management programs similarly see the utility reducing the intensity of EV charger power consumption or even stopping it entirely for brief periods of time when electric system conditions render such action necessary. A good example of this kind of tariff is offered by United Illuminating in Connecticut. The CT EV Charging Program is a demand response program where participating customers receive an incentive to

allow United Illuminating to adjust its Smart Level 2 chargers power consumption during peak periods. Another example, offered by Duke Energy-Carolinas and Duke Energy-Florida, offers a flat monthly subscription price for unlimited charging, with the timing and power intensity of the charging being directly controlled by the utility or pre-programmed into the EV charger by the utility. Such active charge management programs can have terms and conditions that indicate what state of charge (i.e., percent of total) the utility must guarantee to be achieved and available to the participating customer by what time of the day. Illustratively, such a program may offer unlimited charging for $20 per month, guaranteed to have 80% of a full EV battery charge ready for the participating customer by 7:00 am.

These voluntary tariff-based programs have merit and ought to be studied further and addressed in public policy statements. As such, MCR believes that the Policy Statement should encourage Pennsylvania utilities to consider active management programs as they develop their EV-specific rate design.

C. Public and Third-Party Charging

Rate structures for chargers available to the public are emerging as a significant issue of debate today. Public charging is an important issue because publicly accessible chargers are recognized as the primary way lower income, multifamily, and non-residential customers in leased space access EV charging.

The Policy Statement is correct that EV rates should reflect the actual costs incurred by charging given core principles of cost of service ratemaking and its recognition of associating rates with cost causation. For example, cost causation and cost of service would suggest that since EV chargers alone represent kW-loads of eight (low-capacity Level 2) to 350 or more kW (high voltage direct current chargers) of demand, there should be a demand charge component to

the associated EV charging rate. For all residential customers and many small non-residential customers currently on an energy-only rate, this is a significant problem. In addition, there are issues around utility- versus third party-ownership of public chargers. If policy prohibits utility ownership of public charging infrastructure, or regardless, when non-utility third-parties own and operate public charging, a debate centers around whether the rates offered for charging should be cost of service-based or "market-based." Typically, utility-owned public charging is offered at rates based on cost of service. However, for third-party chargers, the owner of the charger is charged a metered rate by the utility and then charges a different price to the public users of the charger. The rates charged to the public users of the charger are "market-based" to include recovery of the utility's bill, the cost of the installation and maintenance of the charger by the third-party, and some mark-up or profit margin to the owner. Of course, this means, by definition, the third-party EV charger owner's rate to the public users of that charger will be higher than a utility's cost of service-based pricing. This causes arguments from non-utility charging providers that the utility is being anti-competitive due to its ability to offer relatively lower EV charging rates.

The issues here are complex and there are no industry standards or resolutions to these issues that have emerged yet to add to the Policy Statement. MCR, instead, suggests additional time, likely in a working group or stakeholder process, to specifically address public charger ownership and cost of service-based versus market-based rates.

D. Locational Issues in EV Charging

A final point MCR will raise on EV charging rates is that of locational variation. The location of significant numbers of EV chargers on a utility's distribution system has a bearing on the cost to serve those chargers. If chargers are located on a heavily loaded, or overloaded, distribution

circuit or feeder, or in areas where transmission capacity to serve the distribution system is limited, substantial investments in the transmission and/or distribution system may be required. Therefore, regardless of the type of rate design in use, modification of rates may be necessary to reflect such location-specific costs in the rates, or development of separate rate schedules may be required for applicability to parts of the distribution system that have significantly different transmission and distribution costs or incremental investment (cost) requirements. A "hosting study" is typically required to identify the capacity of each part of the electric system to adequately handle incremental loads due to EV chargers. Alternatively, a policy choice could be to socialize incremental infrastructure needs across the whole of the customer population or certain classes of customers across the whole of the service territory.

Due to these potential issues, MCR believes that the Policy Statement should encourage Pennsylvania utilities to consider variable rates for EV customers based not only on the time of day and the level of demand on the electric grid, but also the location of demand on the electric grid.

IV. CONCLUSION

MCR largely agrees with the Policy Statement and recommends a few additions to address more fully the issues inherent in EV Rate Design. Specifically, MCR recommends that the Policy Statement should encourage utilities to consider whether separately metering or using telematics to determine EV-specific usage would be in their customers' best interest, and to consider not just charges but also bill credits for usage during specific times of day. The Policy Statement should encourage utilities to consider not only "passive" rate design, but also active demand management rates to regulate the demand on the electric grid by EVs. Lastly, the Commission should add language to the Policy Statement that encourages Pennsylvania utilities

to consider variable rates for EV customers based not only on the time of day and the level of demand on the electric grid, but also the location of demand on the electric grid. Additionally, MCR recommends supplementary discussion, or potentially a different process to address issues related to public charging.

The Commission's Policy Statement is a step forward in the pursuit of fair and reasonable rates for electric vehicles in the Commonwealth of Pennsylvania. Its promotion of utility-specific variable rates to account for demand and time-period of usage is well-founded and follows industry best practices.

Respectfully submitted,

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