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May 16, 2019

VIA ELECTRONIC FILING
Daniel P. Wolf
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

RE: In the Matter of Minnesota Power's Docket No. Petition for Approval of its Electric Vehicle Commercial Charging Rate Pilot Docket No. E015/M-19-___

Dear Mr. Wolf:

Minnesota Power herby submits this Petition to the Minnesota Public Utilities Commission ("Commission") in accordance with Commission Order in Docket No. E999/CI-17-879 and pursuant to Minnesota Rules 7829.00, subp. 1, and 7826.1300. Minnesota Power is proposing a three year Electric Vehicle Commercial Charging Rate Pilot for Commercial and Industrial Customers (the "Pilot Program"). The Pilot proposal consists of on-and-off peak periods as well as a 30 percent cap on demand charges and is designed to address the high demand charges associated with EV charging, particularly in fleet and public charging applications.

This Pilot is an important first step in incentivizing EV adoption and meeting the needs of early adopting customers. Minnesota Power is submitting this Pilot Program proposal to the Commission in order to take advantage of current and upcoming EV opportunities within its service territory while meeting customer expectations.

Objectives for the Pilot:
Ease of Use: The Company designed the Pilot so that it is easy for customers to implement and utilize.

Education and Learning: The Pilot should allow customers to get comfortable with the EV charging technology and provide information to Minnesota Power about the costs to serve these customers. Many of these customers have never worked with EV charging infrastructure and will require time to adapt and experiment for optimal usage.

The Company appreciates the Commission's attention to this matter and is available to answer any questions related to the proposed Pilot Program.

Please contact me at the number above with any questions related to this matter.

Respectfully,

Jenna Warmuth

STATE OF MINNESOTA

BEFORE THE

MINNESOTA PUBLIC UTILITIES COMMISSION

In the Matter of Minnesota Power's Petition for Approval of its Electric Vehicle Commercial Charging Rate Pilot	Docket No. E015/M-19-___ **PETITION**

Summary of Filing

Minnesota Power (or "the Company") submits this Petition to the Minnesota Public Utilities Commission ("Commission") in accordance with Commission Order in Docket No. E999/CI-17-879 and pursuant to Minnesota Rules 7829.00, subp. 1, and 7826.1300. Minnesota Power respectfully requests that the Commission approve its Electric Vehicle Commercial Charging Rate Pilot as proposed.

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STATE OF MINNESOTA

BEFORE THE

MINNESOTA PUBLIC UTILITIES COMMISSION

In the Matter of Minnesota Power's Petition for Approval of its Electric Vehicle Commercial Charging Rate Pilot	Docket No. E015/M-19-___ **PETITION**

I. INTRODUCTION

In its February 1, 2019 Order Making Findings and Requiring Filings, the Minnesota Public Utilities Commission established general findings, specific findings, and outlined directives for Minnesota's utilities related to the advancement and adoption of electric vehicle ("EV") integration.

General Findings:

- Electrification is in the public interest
- Barriers to increased EV adoption in Minnesota include but are not limited to: (a) inadequate supply of and access to charging infrastructure, and (b) lack of consumer awareness of EV benefits and charging options.
- How EVs are integrated with the electric system will be critical to ensuring that transportation electrification advances the public interest.
- Minnesota's electric utilities have an important role in facilitating the electrification of Minnesota's transportation sector and optimizing the cost-effective integration of EVs.

Specific Findings:

- Minnesota's investor owned utilities should take steps to encourage the cost-effective adoption and integration of EVs
- The following should be included at a minimum in any EV-related utility proposals:
    - Any EV-related proposals that involve significant investments for which the utility is seeking or will seek cost recovery should include a cost-benefit analysis that shows the expected costs along with the expected ratepayer, system and societal benefits associated with the proposal
    - In the case of a proposed pilot, the utility filing should include specific evaluation metrics for the pilot and identify what the utility expects to learn from the pilot.
- Utilities should use the Commission's current environmental externality values for carbon and criteria pollutants in analyzing the societal costs and benefits associated with EV-related proposals. Cost-benefit analyses should consider potential long-term ratepayer and societal benefits, including better grid management, public health, and other social

benefits. These analyses should also consider potential long-term costs, including the risk of stranded investment.

- The Office of the Attorney General ("OAG") suggested three-step process for evaluating utility investments in public charging infrastructure is reasonable.
- Utility investments and arrangements related to charging infrastructure should be designed to ensure interoperability, using standard such as Open Charge Point Protocol and Open Automated Demand Response.
- No single method of cost recovery should be generally precluded at this time for any EV-related investments.
- Minn. Stat. § 216B.1614, subd. 2(c)(2), allows utilities the opportunity to recover costs related to educating customers on the benefits of EVs beyond those costs related specifically to the utility's EV tariffs.

Actions:

Table 1: Commission Action - Electric Vehicles

Filing	Due Date
Report of planned 2019 EV proposals	March 31, 2019
Annual EV Reports required under Minn. Stat. § 216B.1614, subd. 3, including promotional cost recovery mechanisms	June 1, 2019
Transportation Electrification Plan	June 30, 2019
Proposals for infrastructure, education, managed charging, etc.	No later than October 31, 2019

- In any future pilot proposal, utilities should include a discussion of the following topics to the extent relevant:
  - Environmental justice, with a focus on communities disproportionately disadvantaged by traditional fossil fuel use;
  - Low-income access and equitable access to vehicles and charging infrastructure, which can include all-electric public transit and EV ride-sharing options;
  - Environmental benefits, including but not limited to carbon and other emission reductions;
  - Potential economic development and employment benefits in Minnesota;
  - Interoperability and open charging standards;
  - Load management capabilities, including the use of demand response in charging equipment or vehicles;
  - Energy and capacity requirements;
  - Pilot expansion and/or transition to permanent status at a greater scale;

- Education and outreach;
- Market competitiveness/ownership structures;
- Distribution system impacts;
- Cost and benefits of the proposal;
- Customer data privacy and security; and
- Evaluation metrics and reporting schedule.

Minnesota Power submits this Petition in accordance with the above referenced Commission findings and actions.

SUMMARY OF PILOT PROPOSAL:

Minnesota Power is proposing a three year Electric Vehicle Commercial Charging Rate Pilot for Commercial and Industrial Customers (the "Pilot Program"). The Pilot proposal consists of on-and-off peak periods as well as a 30 percent cap on demand charges and is designed to address the high demand charges associated with EV charging, particularly in fleet and public charging applications, as depicted in Table 2. This Pilot proposal is an initial step towards incentivizing EV charging and will need to be refined as current barriers, as outlined in Section II, are overcome and knowledge is gained. Full details of the Pilot proposal rate structure can be found in Section III of this Petition.

Table 2: Tariff Design

	CURRENT GENERAL SERVICE DEMAND TARIFF	PROPOSED PILOT PROGRAM TARIFF
ON-PEAK DEMAND CHARGE[1]	$6.50	$6.50
OFF-PEAK DEMAND CHARGE	$6.50	$0.00
ENERGY CHARGE	$0.07619	$0.07619
OTHER		30% DEMAND CAP

PURPOSE AND OBJECTIVES OF THE PILOT PROPOSAL:

Minnesota Power is submitting this Pilot proposal to the Commission in order to take advantage of current and upcoming EV opportunities within its service territory while meeting customer

[1] Minnesota Power's standard General Service rate does not include on-and-off-peak periods.

expectations. The Company is placing an emphasis on encouraging a growing market by reducing costs to public and fleet EV charging customers.

Objectives for the Pilot:

Ease of Use: The Company designed the Pilot so that it is easy for customers to implement and utilize.

Education and Learning: The Pilot should allow customers to get comfortable with the EV charging technology and provide information to Minnesota Power about the costs to serve these customers. Many of these customers have never worked with EV charging infrastructure and will require time to adapt and experiment for optimal usage.

Minnesota Power respectfully requests that the Commission approve its Electric Vehicle Commercial Charging Rate Pilot as proposed.

II. PROCEDURAL MATTERS

In accordance with Minn. Rule Minn. Stat. § 216B.1614, as well as the administrative rules governing this request, Minn. R. 7829.1300, Minnesota Power submits its Electric Vehicle Commercial Charging Tariff Pilot proposal.

Minnesota Power submits the following information:

A. Name, Address, and Telephone Number of Utility
(Minn. Rules 7825.3500 (A) and 7829, subp. 3 (A))

Minnesota Power
30 West Superior Street
Duluth, MN 55802
(218) 722-2641

B. Name, Address, and Telephone Number of Utility Attorney
(Minn. Rules 7825.3500 (A) & 7829, subp. 3 (B))

David R. Moeller, Senior Attorney
Minnesota Power
30 West Superior Street
Duluth, MN 55802
(218) 723-3963
dmoeller@allete.com (e-mail)

C. Date of Filing and Date Proposed Rates Take Effect
This petition is being filed on May 15, 2019. The proposed rate will take effect upon Commission approval.

D. Statute Controlling Schedule for Processing the Petition
This petition is made in accordance with Commission Order in Docket No. E999/CI-17-879 and pursuant to Minnesota Rules 7829.00, subp. 1, and 7826.1300.

Minnesota Power's request for its Electric Vehicle Commercial Charging Tariff Pilot, falls within the definition of a "Miscellaneous Tariff Filing" under Minn. Rules 7829.0100, subp. 11 and 7829.1400, subp. 1 and 4 permitting comments in response to a miscellaneous filing to be filed within 30 days, and reply comments to be filed no later than 10 days thereafter.

E. Utility Employee Responsible for Filing

Jenna Warmuth
Senior Public Policy Advisor
30 West Superior Street Duluth, MN 55802
(218) 355-3448
jwarmuth@mnpower.com (e-mail)

F. Official Service List

Pursuant to Minn. Rule 7829.0700, Minnesota Power respectfully requests the following persons to be included on the Commission's official service list for this proceeding:

David R. Moeller	Jenna Warmuth
Senior Attorney	Senior Public Policy Advisor
Minnesota Power	Minnesota Power
30 West Superior	30 West Superior Street
Duluth, MN 55802	Duluth, MN 55802
(218) 723-3963	(218) 355-3448
dmoeller@allete.com	jwarmuth@mnpower.com

G. Service on Other Parties

Minnesota Power is eFiling this report and notifying all persons on Minnesota Power's General Service List, Service Lists for Docket Nos E999/CI-17-879 and E015/M-15-120 that this report has been filed through eDockets. A copy of the service list is included with the filing along with a certificate of service.

H. Filing Summary

As required by Minn. Rule 7829.1300, subp. 1, Minnesota Power is including a summary of this filing on a separate page.

SUMMARY OF FILING REQUESTS

Based on information provided throughout this filing, Minnesota Power requests the following:

From the MPUC:

- Acceptance of its proposed Electric Vehicle Commercial Charging Tariff Pilot.

III. BACKGROUND

In its June 1, 2018 annual compliance filing in Docket No. E015/M-15-120, Minnesota Power communicated its intent to submit a commercial EV tariff designed to address high demand charges typically associated with commercial EV charging and shift EV charging to off-peak time periods. As described in the June 1, 2018 filing, one driver for the focus on commercial EV charging rates is the Duluth Transit Authority's ("DTA") procurement of seven fully electric Proterra[2] transit buses in the third quarter of 2018. The Company has worked with the DTA to understand the customer experience and challenges of operating electric buses in a northern climate. In addition to the DTA, Minnesota Power has engaged in conversations with customers interested in converting their fleets to electric vehicles, potential site hosts for public charging stations, and public charging companies that have deployed (or plan to deploy) EV charging within Minnesota Power's service territory to better understand their challenges as they relate to Minnesota Power rates. The insights gained from these conversations and interactions were used in the development of this Pilot.

In its February 1, 2019 Order Making Findings and Requiring Filings in Docket No. E015/M-17-879, the Commission directed the investor-owned utilities in Minnesota to file proposals, which can be pilots, to enhance the availability of or access to charging infrastructure, increase consumer awareness of EV benefits, and/or facilitate managed charging or other mechanisms that optimize the incorporation of EVs into the electric system. Minnesota Power recognizes that EV-enabling rates are a critical component of advancing the electric vehicle market in Minnesota. This Pilot proposal is intended to provide a short-term solution to barriers commonly experienced in commercial charging applications while also recognizing that more information is needed before Minnesota Power can formulate a permanent rate for these applications.

Utilities around the country are working to understand how to best serve this emerging class of customers through rates, infrastructure, programs and more. A report released in January 2019 by The Brattle Group describes the options for increasing adoption of direct current fast charging stations ("DCFC") through rates.[3] According to the report, "designing the "perfect" DCFC rate may not need to be the top priority initially. Experimentation and learning what works to facilitate DCFC adoption in an equitable and efficient manner may be more appropriate near-term objectives." Placing limits on demand-related charges, as this Pilot proposes to do, is one option described in the report as a means to facilitate DCFC deployment.

[2] See https://www.proterra.com/ for more information.
[3] See http://files.brattle.com/files/15077_increasing_ev_fast_charging_deployment_-_final.pdf

Stakeholder Outreach

Minnesota Power intentionally engaged multiple stakeholders in the development of this Pilot. These stakeholder included the Duluth Transit Authority, Fresh Energy, Office of the Attorney General, Department of Commerce, ChargePoint, Citizens Utility Board, Greenlots, Tesla and ZEF Energy. While not all of the stakeholder's concerns or needs could be addressed in this initial Pilot design, the discussions have proven valuable and the Company is better prepared to address each stakeholder's concerns. The Pilot analysis will also be designed in a way that will provide insight into these areas of concern and interest.

Consultation with customers and the above-mentioned stakeholders informed the development of this Pilot proposal which is designed to address the high demand charges associated with EV charging, particularly in fleet and public charging applications. Utilities around the country are working to better understand the characteristics of EV charging customers in an attempt to develop best practices to encourage optimized charging. The enclosed Pilot proposal was designed as a short-term solution to meet the immediate needs of commercial customers who have installed, or are considering installing, EV charging infrastructure for public and fleet applications. A bridging solution is needed to remove barriers to entry into the market while the Company continues to gather and analyze data needed to design a rate that provides more accurate price signals for optimized charging. This Pilot is an educational tool for customers to begin experimenting with load shifting. It is meant to encourage thoughtful and beneficial charging that will not only reduce costs for EV customers, but also support enhanced grid management.

Technology and Metering Considerations

Currently, over 50 percent of Minnesota Power's meters in the field are advanced metering infrastructure ("AMI"). Minnesota Power is actively deploying AMI throughout its service territory, largely through meter attrition, at a rate of approximately 6-8 percent (roughly 10,000 meters) annually, continuing over the next several years. Minnesota Power estimates full deployment of all AMI meters by the end of 2025. Along with the AMI meter deployment, Minnesota Power completed implementation of its Radio Frequency AMI network communications infrastructure in 2018.

Upon implementation of its new Meter Data Management ("MDM") system, the Company will have the capability to bill customers utilizing hourly data received from the meters. Usage bucketing will be handled by the MDM, thereby removing the need for manual custom programming of meters for more complex time-varying rates. Consequently, scalability and speed to enroll customers in an innovative or time-varying rate will increase significantly and the associated cost will decrease significantly. With a MDM in place, it is easier for the meters to communicate usage rather than the current practice of getting them to recognize and accept a command. This will result in fewer billing issues and far less manual billing interventions. In the current context, the meters bucket all usage and communicate a large daily file back to the Company's Customer Information System ("CIS"). With a full AMI/MDM established, the data will be transmitted several

times a day, which typically equals greater success. A MDM will also allow for flexibility to efficiently change the time periods for rates.

The Company completed a request for proposal ("RFP") process and MDM selection in late 2018. As a result of its robust RFP process, the Company selected the Oracle Customer to Meter Solution ("Oracle C2M") in November of 2018. The next step in the MDM implementation process is to select a System Integrator ("SI") to assist with the design, build, testing, and implementation of the Oracle C2M solution. The Company currently has an RFP process underway and anticipates SI selection in 3rd quarter of 2019. The presence of a MDM will create a more user-friendly experience for customers and also has the potential to drastically reduce manual billing and programming issues currently experienced with customized rates and programs.

With the complete deployment of AMI and the implementation of the MDM Minnesota Power will have the capability to efficiently revise peak time periods as well as gain enhanced insight into customer usage patterns. In all practicality, an MDM solution needs to be in place systemically prior to system-wide rollout of several time varying rate programs. The Company is currently awaiting Commission direction on its February 20, 2019 filing in Docket No. E015/M-12-233 which outlines how a system-wide Time-of-Day rate could be implemented in Minnesota Power's service territory. The outcome of this docket will likely inform many program offerings, including this Pilot proposal.

IV. TARIFF DESIGN

TARIFF DESIGN OVERVIEW:

Minnesota Power is proposing an Electric Vehicle Commercial Charging Rate Pilot for Commercial and Industrial customer's electric service requirements for electric vehicle loads including battery charging and accessory usage which are supplied through a separate meter. The Pilot proposal will have a limited three-year term. Service will be limited to customers with total power requirements greater than 10 kW but less than 10,000 kW and will be subject to Company's Electric Service Regulations and any applicable Riders. With the continued expansion of transportation electrification, the Company is interested in gathering data on how best to serve these customers and the costs to serve this customer class, while at the same time providing incentives to efficiently and cost-effectively utilize grid resources.

The Company examined the usage patterns of six commercial customers who currently have electric vehicle charging infrastructure in use. All of these customers are currently billed under the General Service Demand ("GSD") rate. As shown in Table 3 the current demand charge total represents more than 50 percent of these customers' bills, and in some cases more than 80 percent. Dividing an average GSD customer's total bill by their monthly usage results in a cost of roughly $0.08 per kWh, whereas these commercial EV charging customers are typically paying more than four times that amount.

The Company compared these six customers to all GSD customers and found that they are in the upper 90th percentile when customer bills are expressed as a dollars per kWh metric ("$/kWh"). This is directly related to these customers having relatively low load factors, which ranged from approximately 1% – 8%. Knowing that customers with low load factors also tend to have low coincidence factors, it stands to reason that these type of customers are less likely to experience peak demands coincident with the Company's system peak. To address the fact that these customers are paying significantly more per kWh than nearly all other GSD customers, the Company is proposing to implement a cap on demand charges. The proposed demand charge for this pilot will not make up more than 30 percent of a customer's monthly bill, and in addition, demand charges during off-peak time periods will be eliminated altogether to promote customer charging at times that are more advantageous to the distribution grid.

The purpose of the proposed 30 percent demand cap is to bring these customers more in-line with other GSD customers on a $/kWh basis. As shown in Table 4 doing so moves these customers closer to the average $/kWh percentile rank with an average total rate of roughly $0.12 per kWh.

Table 3: Current Demand Charge Impact

Customer	Demand Charge as % of Bill	Bill/kWh	Percentile Rank (Bill/Kwh) among GSD
1	56%	$ 0.19	94.8%
2	75%	$ 0.34	98.8%
3	73%	$ 0.31	98.7%
4	78%	$ 0.38	99.1%
5	78%	$ 0.39	99.1%
6	88%	$ 0.78	99.7%

Table 4: Demand Charge Impact of Pilot Tariff

Customer	Demand Charge as % of Bill	Bill/kWh	Percentile Rank (Bill/Kwh) among GSD
1	30%	$ 0.12	65.5%
2	30%	$ 0.12	67.0%
3	30%	$ 0.12	67.7%
4	30%	$ 0.12	69.7%
5	30%	$ 0.12	69.8%
6	30%	$ 0.14	82.7%

Demand charges serve a specific purpose for incentivizing flattening of individual customer peak loads. However, as outlined in the Regulatory Assistance Project's ("RAP") June 2018 "Ensuring Electrification in the Public Interest" report, "*the intent of beneficial electrification should be to provide incentives for customers to adjust their usage in a way that is helpful for managing system peaks.*"[4] The report goes on to state, "*more effective rate structure[s] would encourage these customers to move their charging to off-peak times for the grid as a whole, when it is less stressed*

[4] Farnsworth, Shipley, Lazar, Seidman "Ensuring Electrification in the Public Interest" https://www.raponline.org/knowledge-center/beneficial-electrification-ensuring-electrification-public-interest/

and less expensive to serve (Farnsworth, et al. 43)." The peak periods also proposed through this Pilot are an appropriate and advantageous starting point to meet these beneficial electrification objectives. By reducing the impact of demand charges for these customers, it provides flexibility for them to charge at times that are more advantageous to the distribution grid.

Demand Charge for On-Peak

For the purposes of this Pilot proposal the Billing Demand is defined as the kW measured during the 15-minute period of the customer's greatest use during the specified On-Peak periods during the month, as adjusted for power factor, but not less than the minimum demand specified in customer's contract. On-Peak periods are defined as 8:00 a.m. to 10:00 p.m., Monday through Friday, inclusive, excluding holidays. Holidays are those days nationally designated and celebrated as New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving and Christmas. All other hours are considered to be Off-Peak periods and there is no demand charge applied during these times. Minnesota Power recognizes that targeted On-Peak time periods would be ideal for this rate and for these customers. However, there are currently limitations to the AMI and MDM data/billing process as discussed earlier in this filing, as well as limited information on the usage patterns for these customers. Attempting to create a more targeted peak period for these commercial load customers is unadvisable without first providing an opportunity for both customer and utility education and analysis.

While the current/proposed On-Peak period covers a broad portion of the day, it does generally align with the Company's system load profile as depicted in Figure 1. Minnesota Power has a high load factor due to the predominance of large industrial customers in its customer mix. This translates to a unique load profile when compared to other utilities across the United States. Minnesota Power's system is winter-peaking, with highest demand typically occurring on a winter evening, either in December or in January. It is also notable that the summer system peak typically occurs earlier in the day, in the afternoon, compared to the evening winter peak. The proposed On-Peak period for the Pilot follows these high demand time periods and will not only aid the Company in more effectively managing its grid resources, but will also take advantage of periods of high renewable penetration, mainly wind, during the overnight hours.

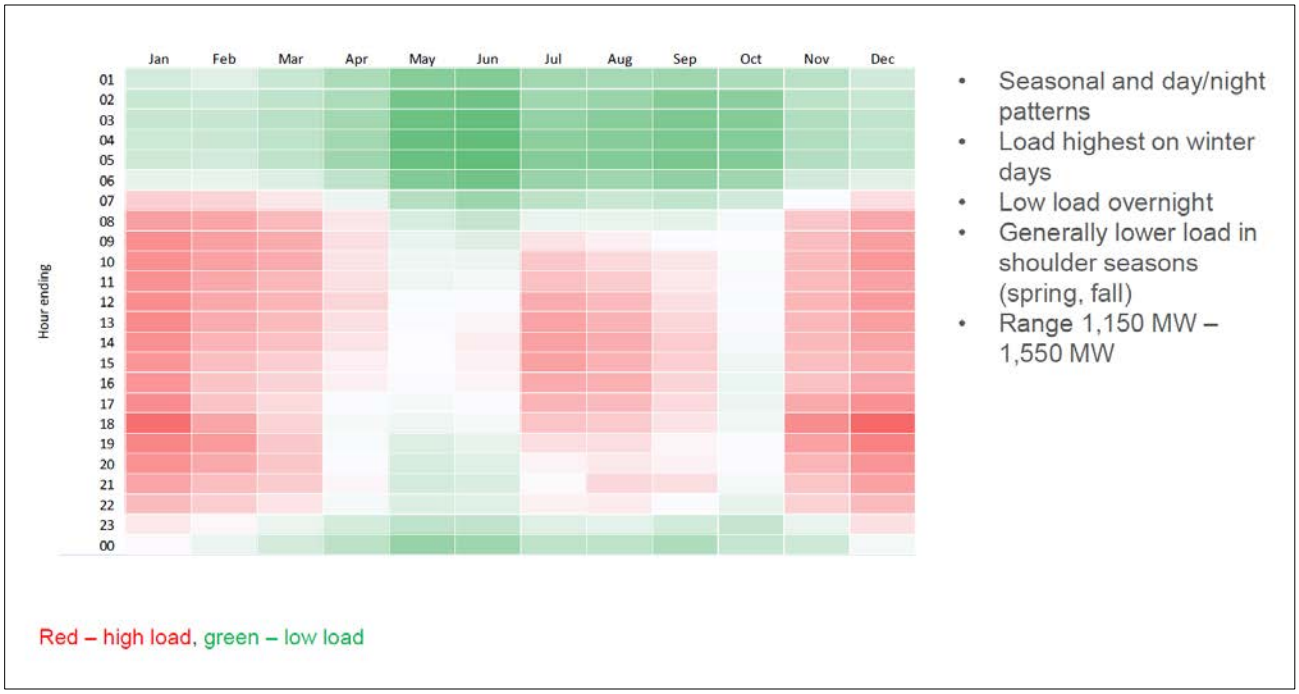

Figure 1: Gross Load Heat Map

Energy Charge for all kWh

The energy charge for the Pilot proposal will be set equal to the standard GSD rate energy charge. At this time Minnesota Power's GSD energy charge is equal to 7.619¢. This rate will be multiplied by all kWh used during the billing period.

Barriers Addressed through Tariff Design

At a high-level the Company is attempting to address the most prominent barriers to fleet and public EV charging applications with this Pilot. The Company realizes this is not a definitive solution and is excited to partner with customers that are going through early iterations of business model and technology pilots in the electrification of transportation movement. For fleet, the long-term strategy will be to send price signals that incentivize customers to charge when it's most beneficial for the grid– times of high overall available capacity. At face-value it may seem that fleet owners will be able to be precise and intentional with their charging patterns, but as medium and heavy duty fleet technology is still in the very early stages (especially within Northern Minnesota and cold climates) there needs to be room for flexibility. Transit, short-haul delivery, and school buses may not be able to limit their charging to the off-peak hours and still meet the current needs of business-as-usual, i.e. no impacts to their current routes.

As mentioned, the Company has engaged the DTA in ongoing discussions to support its innovative program. Minnesota Power is interested in providing alternative rate design options for low-load-factor customers similar to the DTA and public charging that wish to deploy DCFC. Load factor characteristics often associated with facilities deploying DCFC stations can lead to high demand charges for charging stations relative to their low utilization of energy, thereby reducing the cost effectiveness of electric transit options. Recognizing the significantly different load profile of DCFC facilities as compared to average commercial customers, the Company developed its Pilot proposal to mitigate these high demand charges. This program will also educate customers on the benefits of off-peak charging and provide incentives to shift demand to off-peak times.

For both fleet and public vehicle charging, demand charges are a barrier, but most significantly to a public charging station, which typically has a low load-factor. By capping demand rate billings, the Company is minimizing the economic risks to these public charging station owners, which are so critical to the advancement of electric transportation adoption. The 30 percent cap was determined to be a balanced approach that recognizes most public charging takes place during the On-Peak period, but lowers the impact that demand would have to a level that doesn't discourage progress. All while the industry transitions to rates that support beneficial electrification and grid modernization.

V. COMPLIANCE

Low-income access and equitable access to vehicles and charging infrastructure, which can include all-electric public transit and EV ride-sharing options;

"*According to a 2017 report from the Center for Climate and Energy Solutions*[5]*, emissions-related health issues like higher risk of cancer, asthma, emphysema, heart disease and inhibited child development disproportionately impact lower income communities. … EVs can combat these issues, according to the report, benefiting these communities three-fold through improved air quality, reduced greenhouse gas emissions and savings in terms of operating costs like fuel and maintenance expenses.*[6]*"* As outlined in the Center for Climate and Energy Solutions report, the expansion of any fleet, transit, or public charging expansion will positively affect low income customers because EVs produce no tailpipe emissions. The Company recognizes the need for tailored low income EV programming and plans to examine possible program structures for future development.

The intent of this Pilot proposal is to encourage deployment of commercial EV charging applications including work place, public and fleet such as electric buses. While this Pilot is not specifically designed to increase low income or equitable access to EV charging, increasing the amount of EV chargers available for public use will benefit all Minnesota Power customers.

Environmental benefits, including but not limited to carbon and other emission reductions;

In 2017, transportation was the leading sector for GHG emissions in United States[7]. As the electricity sector continues to reduce emissions this will only improve the environmental benefits of electrifying the transportation sector.

Electric Vehicles eliminate (Battery Electric Vehicles (BEV)) or dramatically reduce (Plug-in Hybrid Electric Vehicles) tailpipe emissions (nitrogen oxides (NOx), and fine particles ($PM_{2.5}$)) from individual vehicles, as well as reduce the overall "well-to-wheel" greenhouse gas emissions (GHG) associated with electrifying the transportation sector[8]. A BEV charged from Minnesota's grid vs. a gasoline vehicle already emits less overall carbon dioxide equivalent (CO_2e), NO_x, and $PM_{2.5}$ according to the Minnesota Pollution Control Agency, as shown below. Electricity is continually sourced from cleaner and more renewable sources, only improving the projections of environmental benefits

[5] https://www.c2es.org/site/assets/uploads/2017/11/electrified-transportation-for-all-11-17-1.pdf

[6] https://sustainableamerica.org/blog/making-evs-possible-for-low-income-drivers/

[7] https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions

[8] https://www.pca.state.mn.us/air/electric-vehicles

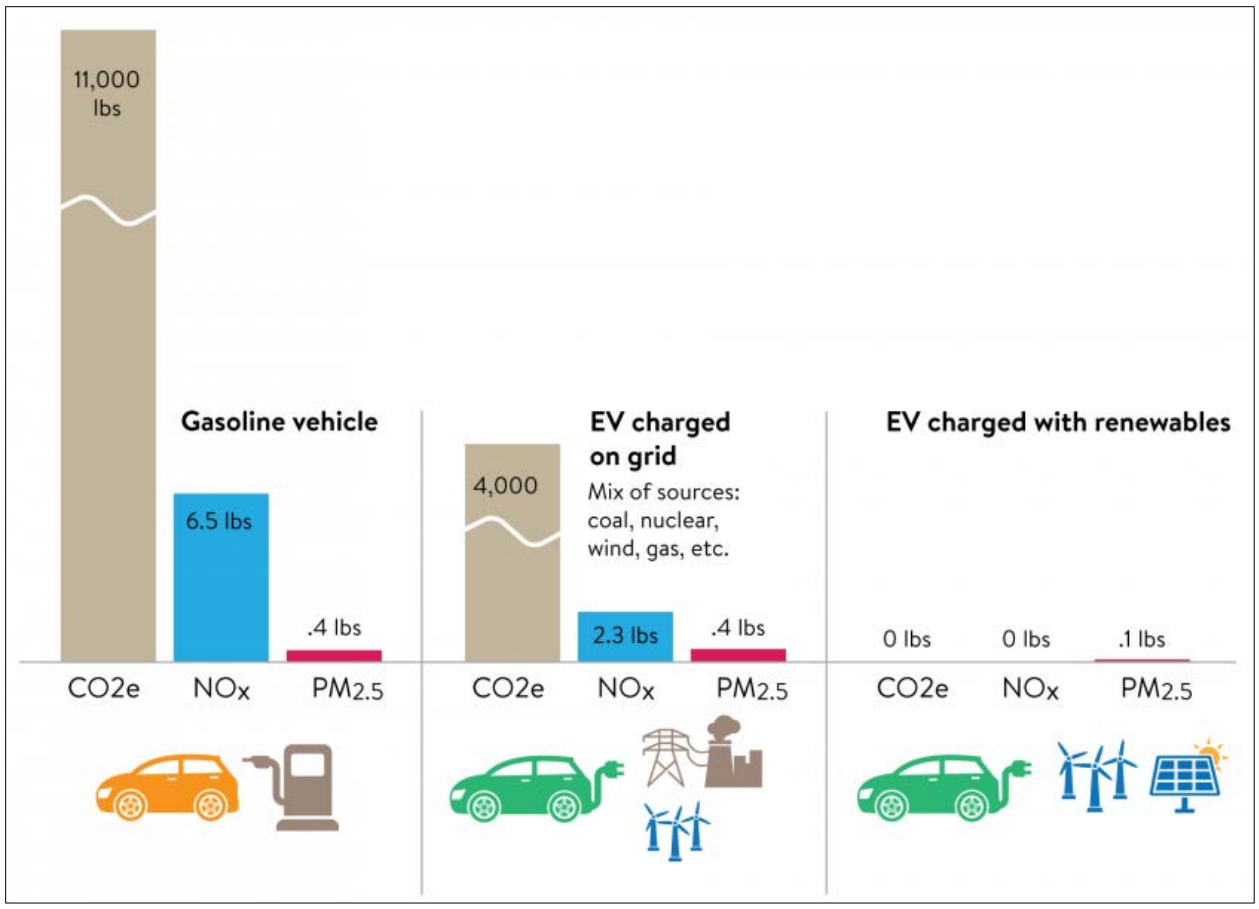

Figure 2: Annual emissions from electric vehicles and gasoline vehicles in Minnesota (12,000 miles)

Furthermore, optimizing when these vehicles charge through price signals to the customer, or future technology-based smart charging could aid in minimizing the impacts of adding to system peaks or need for additional capacity. Electric vehicles are more energy efficient and at the center of the beneficial electrification movement. According to the U.S. Department of Energy, EVs convert about 59 to 62 percent of the electrical energy from the grid to power at the wheels. Their internal combustion engine counterparts only convert 17 to 21 percent of the energy stored in gasoline to power at the wheels[9]. These efficiency numbers do not include energy used in the production of the electricity or gasoline.

In addition to Light Duty Vehicles, Minnesota Power considers public transit greatly important when prioritizing initiatives to support the growth of various applications of electric transportation. "By moving more people with fewer vehicles, public transportation can reduce greenhouse gas emissions. National averages demonstrate that public transportation produces significantly lower

[9] https://www.fueleconomy.gov/feg/evtech.shtml

greenhouse gas emissions per passenger mile than private vehicles[10]". Electrifying public transit, which is already more efficient in principle than light-duty vehicles, will only improve the reductions in GHG and optimization of the grid. A Battery Electric Bus ("BEB") represents a significantly higher amount of demand and energy usage.

According to a 2018 study conducted by the National Renewable Energy Laboratory ("NREL") in California, BEBs demonstrated more than twice the efficiency on a miles per gallon equivalent, compared to a diesel bus.[11] The Duluth Transit Authority is currently participating in a similar pilot. While these results are promising, Minnesota Power and the DTA have been in communications about the various other benefits and drawbacks unique to our region and climate.

Energy and capacity requirements;

The Company expects minimal short-term change in energy and capacity requirements due to the initiation of this Pilot. However, the longer-term impacts of this Pilot or any subsequent Commercial EV rate could be substantive.

Energy and capacity requirements will grow with EV adoption. The proposed Pilot is not intended to reduce energy use, only to shift that energy use to off-peak periods. Overall energy requirements are unlikely to be affected by this Pilot in the short-term. However, in the long-term, it's likely that the incentive offered in this Pilot will accelerate adoption of EV's and increase overall energy requirements on the system. Any on-peak to off-peak load shifting will reduce the Company's system demand relative to a "no load-shifting" scenario.

Education and outreach;

Minnesota Power has continually engaged current and potential EV owning commercial customers as outlined through this Petition. The Company will continue to reach out to known EV owning commercial customers as well as make efforts to perform outreach to other potential qualified commercial customers.

The Company will advertise the Pilot program to potential qualified customers through its website, promotional materials and one-to-one contacts. The Company works closely with its commercial customers and plans to highlight the benefits of EV ownership as well as the optionality the Pilot proposal can provide their business and customers.

[10] https://www.transit.dot.gov/regulations-and-guidance/environmental-programs/transit-environmental-sustainability/transit-role

[11] https://afdc.energy.gov/files/u/publication/zero-emission_evaluation_county_connection_bec.pdf

Distribution system impacts;

The Company expects the Pilot program to have minimal impact on the distribution system in the short-term. Existing and future commercial EV customers are currently required to pay for installation of any distribution equipment upgrades necessary to serve new EV load. As such, these customers' EV loads do not currently present a burden for the distribution system. However, as EV charging becomes more prominent and demands on the distribution system increase, it will be beneficial to limit on-peak charging, particularly in fleet applications.

Cost and benefits of the proposal;

The cost of the Pilot proposal will relate to the addition of the installation of the required service, and can vary significantly based on customer location and energy use characteristics. All customers participating in the Pilot will require some additional meter programming to facilitate a difference in on/off-peak demand charges. This programming has a small incremental cost relative to a standard GSD meter, but these costs are not substantial enough at this time to justify additional monthly service charges.

The overall benefits of the proposal to Minnesota Power and customers will depend on how much energy use is shifted to off-peak time periods. Minnesota Power will quantify and analyze the costs and benefits of the Pilot through the various performance metrics outlined in this Petition.

Customer data privacy and security;

Minnesota Power will clarify in each participating customer's service agreement the data to be assigned trade secret and public designation. In keeping with Commission Order[12], the Company will only share a customer's data for a purpose other than related to regulated utility service after the utility obtains consent from the customer that includes a clear statement of the information to be shared and with whom it will be shared.

Evaluation metrics and reporting schedule;

Minnesota Power will track several metrics to assess the success of its proposed Commercial EV charging pilot. Several of these metrics are comparable to cost allocation factors used in Customer Cost of Service Studies and may indicate whether or not the Company was successful in reducing service costs. Other metrics focus on the customer's savings under this EV rate.

1. Daily/monthly coincidence factors - with Minnesota Power system peak and MISO system peak,
2. Daily/monthly on/off-peak and overall load factor
3. Average $/kWh and respective percentile rank within GS Demand
4. Comparison of final bills under different rate structures
5. Daily/monthly kW demand on and off- peak

[12] June 24, 2014 Order in Docket No. E,G-999-CI-12-1344

6. Pre-pilot usage for comparison.
7. Growth in the number of fleet EV or public charging stations.

Minnesota Power will leverage these metrics and stakeholder feedback to inform future rate and program development.

Pilot expansion and/or transition to permanent status at a greater scale;

Minnesota Power will offer the Pilot rate for a three-year period, thereby allowing the Company to:

- gather the information needed to design a rate that sends more accurate price signals and is based on the costs to serve EV charging customers,
- coordinate with the Company's other efforts including the MDM implementation, AMI deployment and time-of-day rate proceeding,
- encourage increased adoption of electric vehicles in northern Minnesota by decreasing the costs associated with public and fleet charging and allowing customers time to experiment with charging patterns and capabilities;
- and provide benefits to all Minnesota Power customers by encouraging charging in the off-peak where possible and increasing load, spreading system costs across a larger customer base.

The Company intends to evaluate the rate during the three-year pilot period based on the criteria listed in this petition and determine whether a commercial EV charging rate is needed going forward and if so, what changes are needed to better optimize EV charging in the future and as adoption increases.

VI. CONCLUSION

Minnesota Power submits this Petition in accordance with Commission findings and actions in Docket No. E999/CI-17-879. The Company appreciates the Commission's attention to this Pilot proposal. This Pilot is an important first step in incentivizing EV adoption and meeting the needs of early adopting customers. The Pilot is meant to be an easy to understand and foundational experience for current and potential fleet and public EV customers. The Pilot is designed to allow customers to adapt to the EV charging technology. It will also allow Minnesota Power to learn more about the costs to serve these customers. Minnesota Power respectfully requests that the Commission approve its Electric Vehicle Commercial Charging Rate Pilot as proposed.

Dated: May 16, 2019

Respectfully submitted,

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PILOT FOR COMMERCIAL ELECTRIC VEHICLE CHARGING SERVICE

RATE CODES

29EV

APPLICATION

Available while this Pilot Program is in effect, to Commercial and Industrial customer's electric service requirements for electric vehicle loads including battery charging and accessory usage which are supplied through one meter. Service shall be delivered at one point from existing facilities of adequate type and capacity and metered at (or compensated to) the voltage of delivery. Service hereunder is limited to Customers with total power requirements greater than 10 kW but less than 10,000 kW and is subject to Company's Electric Service Regulations and any applicable Riders.

TYPE OF SERVICE

Single phase, three phase or single and three phase, 60 hertz, at one standard low voltage of 120/240 to 4160 volts; except that within the Low Voltage Network Area service shall be three phase, four wire, 60 hertz, 277/480 volts.

RATE (Monthly)

Service Charge	$12.00
Demand Charge for On-Peak kW	$6.50
Energy Charge for all kWh	7.619¢

Plus any applicable Adjustments.

MINIMUM CHARGE (Monthly)

The appropriate service charge plus any applicable Adjustments; however, in no event will the Minimum Charge (Monthly) for three phase service be less than $25.00 nor will the Demand Charge per kW of Billing Demand be less than the Minimum Demand specified in customer's contract.

Plus any applicable Adjustments.

PILOT FOR COMMERCIAL ELECTRIC VEHICLE CHARGING SERVICE

HIGH VOLTAGE SERVICE

Where customer contracts for service delivered and metered at (or compensated to) the available primary voltage of 13,000 volts or higher, the monthly bill, before Adjustments, will be subject to a discount of $2.00 per kW of Billing Demand. In addition, where customer contracts for service delivered and metered at (or compensated to) the available transmission voltage of 115,000 volts or higher, the monthly bill, before Adjustments, will be further subject to a discount 0.350¢ per kWh of Energy.

High Voltage Service shall not be available from the Low Voltage Network Area as designated by Company.

ADJUSTMENTS

1. There shall be added to or deducted from the monthly bill, as computed above, a fuel and purchased energy adjustment determined in accordance with the Rider for Fuel and Purchased Energy Adjustment.

2. There shall be added to the monthly bill, as computed above, a transmission investment adjustment determined in accordance with the Rider for Transmission Cost Recovery.

3. There shall be added to the monthly bill, as computed above, a renewable resources adjustment determined in accordance with the Rider for Renewable Resources.

4. There shall be added to the monthly bill, as computed above, a conservation program adjustment determined in accordance with the Rider for Conservation Program Adjustment.

5. There shall be added to the monthly bill, as computed above, a Low-Income Affordability Program Surcharge determined in accordance with the Pilot Rider for Customer Affordability of Residential Electricity (CARE).

6. There shall be added to the monthly bill, as computed above, an emissions-reduction adjustment determined in accordance with the Rider for Boswell Unit 4 Emission Reduction.

7. There shall be added to or deducted from the monthly billing, as computed above, a solar energy adjustment determined in accordance with the Rider for Solar Energy Adjustment.

8. Plus the applicable proportionate part of any taxes and assessments imposed by any governmental authority which are assessed on the basis of meters or customers, or the price of revenues from electric energy or service sold, or the volume of energy generated, transmitted or purchased for sale or sold.

PILOT FOR COMMERCIAL ELECTRIC VEHICLE CHARGING SERVICE

9. Bills for service within the corporate limits of the applicable city shall include an upward adjustment as specified in the applicable Rider for the city's Franchise Fee.

DETERMINATION OF THE BILLING DEMAND

The Billing Demand will be the kW measured during the 15-minute period of customer's greatest use during the On-Peak periods during the month, as adjusted for power factor, but not less than the minimum demand specified in customer's contract. On-Peak periods shall be defined as 8:00 a.m. to 10:00 p.m., Monday through Friday, inclusive, excluding holidays. Holidays shall be those days nationally designated and celebrated as New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving and Christmas. All other hours are considered to be Off-Peak periods, and there is no Demand Charge applied during these times.

Demand will be adjusted by multiplying by 90% and dividing by the average monthly power factor in percent when the average monthly power factor is less than 90% lagging. However, in no event shall the average monthly power factor used for calculation in this paragraph be less than 45%.

DEMAND CHARGE CAP

In no month shall the Demand Charge exceed 30% of customer's total bill excluding any applicable taxes and fees. If the Demand Charge is greater than 30% of the subtotal of the Service Charge, the Demand Charge, the Energy Charge, and all adjustments listed above, the customer shall receive an EV Demand Credit which will be applied against the Demand Charge, capping it at 30% of the pre-tax bill.

PAYMENT

Bills are due and payable 15 days following the date the bill is rendered or such later date as may be specified on the bill.

STATE OF MINNESOTA	)	AFFIDAVIT OF SERVICE VIA
	) ss	ELECTRONIC FILING
COUNTY OF ST. LOUIS	)	

Jodi Nash, of the City of Duluth, County of St. Louis, State of Minnesota, says that on the 16th day of May, 2019 she served Minnesota Power's Petition for Approval of its Electric Vehicle Commercial Charging Rate Pilot on the Minnesota Public Utilities Commission and the Energy Resources Division of the Minnesota Department of Commerce via electronic filing. The persons on the attached Service List were served as requested.

_____

Jodi Nash

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