

**STATE OF MINNESOTA
PUBLIC UTILITIES COMMISSION**

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July 11, 2017

**In the Matter of Residential Electric Vehicle
Charging Tariff – Annual Compliance Filings Dockets 15-111, 15-112, and 15-120**

**INITIAL COMMENTS OF FRESH ENERGY AND MINNESOTA CENTER FOR
ENVIRONMENTAL ADVOCACY**

Fresh Energy and Minnesota Center for Environmental Advocacy submit these initial comments in response to the Commission's June 7, 2017 [Notice of Comment Period](#). We applaud the utilities' efforts to increase electric vehicle adoption. But while electric vehicle adoption is increasing, participation in the utilities' electric vehicle tariffs is dismal: though there are [nearly 5,000](#) plug-in vehicles registered in Minnesota, the state's investor-owned utilities have fewer than 100 customers (combined) on their electric vehicle tariffs. Xcel Energy is taking steps to improve its electric vehicle tariff. These comments recommend specific improvements for Minnesota Power's and Otter Tail Power's tariffs.

Electric vehicle overview

Electric vehicle technology is advancing at a breakneck pace. Battery costs [have fallen dramatically](#), allowing manufactures to offer longer-range vehicles for about the same price. For example, the [2012 Nissan Leaf](#) had a range of 73 miles and started at \$27,700; by comparison, Chevrolet's new [Bolt EV](#) can go more than three times as far (238 miles) and starts at a similar price of \$29,120.¹

Combining affordability with longer ranges has long been seen as the holy grail of electric vehicles. Previously, customers would have to make a trade-off between an affordable car with a limited range (like a Nissan Leaf) or a car that could go far, but was very expensive (like the [Tesla Model S](#), which starts at \$62,000). With the arrival of the Bolt EV and the [Tesla Model 3](#)—which is [now in production](#)—customers no longer have to make a sacrifice. And more and more carmakers are following this trend: [Nissan](#) and [BMW](#) are expected to unveil longer-

¹ Prices include the \$7,500 Federal [tax credit](#) for plug-in electric vehicles.

range electric vehicles this fall, and Volvo [recently announced](#) that all of its cars will be either fully electric or hybrids starting in 2019. These next generation models will allow electric vehicles to move from niche options for city commuters to mainstream vehicles that meet the needs of nearly all drivers.

The additional electricity consumption from electric vehicles could either be a tremendous grid asset or a serious grid liability. For most electric vehicle drivers today, the vast majority of charging occurs at home in their garage. This will only increase as driving ranges increase, as electric vehicles will need to be charged less frequently.

In this context, getting the rate design right is essential. Electric vehicles are the ultimate in flexible load: as long as the car is fully charged by the time they want to leave in the morning, most customers couldn't care less whether the car is charged at 5pm or 4am. All electric vehicles have built-in charging timers, which can be set to charge only during certain hours. But without price signals directing customers to charge overnight, most customers will likely start charging when they get home from work. This will further increase the residential peak and could necessitate expensive distribution system upgrades where there are clusters of electric vehicles charging during peak times.

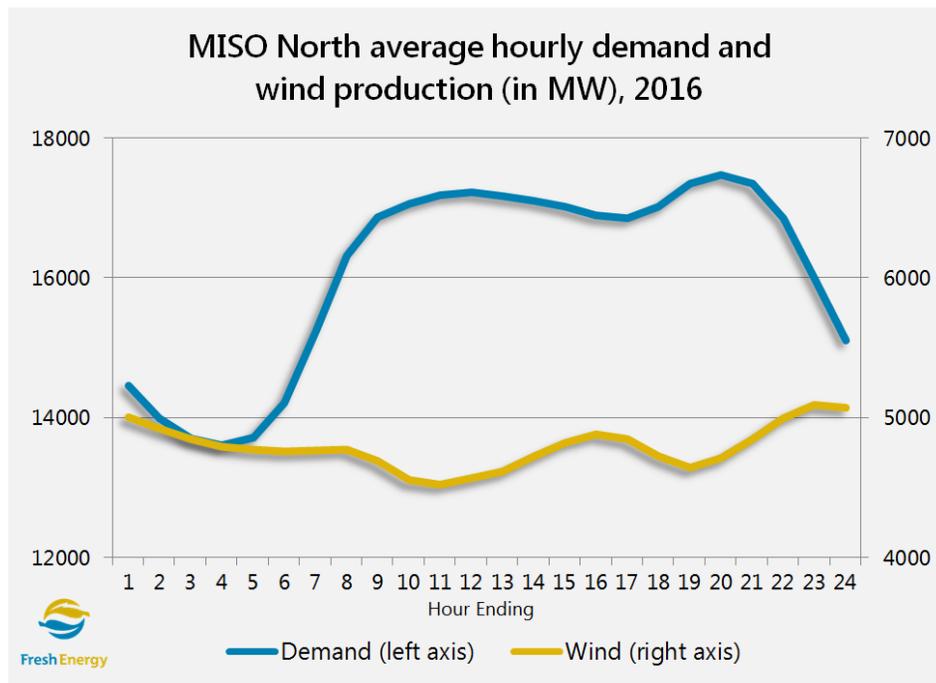
If, on the other hand, customers have the incentive to charge overnight, new electric vehicle load can improve the efficiency of a utility's system and lower rates for all customers. A series of recent studies by the research firm MJ Bradley & Associates attempt to quantify these benefits for six states: [Connecticut](#), [Colorado](#), [Maryland](#), [Massachusetts](#), [New York](#), and [Pennsylvania](#).² For all six states, the studies found electric vehicles would save *all* electric utility customers money, not just those who buy electric vehicles. This is not surprising: if most electric vehicle charging takes place overnight, utilities will add sales revenue without costly distribution system upgrades or new generation capacity, which means lower electric rates for all customers.

Off-peak charging will likely have even greater benefits in Minnesota, as it will allow more wind generation to be added to the grid. The Great Plains have some of the best [wind resource](#) in the world, and utilities have been purchasing long-term contracts for new wind farms for [less than 2¢/kWh](#). But, while wind is the lowest-cost generation available in Minnesota, wind speeds are not constant, so wind turbines produce more electricity at some times than at others. In the upper Midwest, wind production tends to be the highest overnight when demand is lowest, as shown in the graph below.³ Shifting more load to overnight hours would

² M.J. Bradley & Associates, "Plug-in Electric Vehicle Cost-Benefit Analysis," November 2016-April 2017. A summary of the studies can be found here: <http://www.mjbradley.com/reports/mjba-analyzes-state-wide-costs-and-benefits-plug-vehicles-five-northeast-and-mid-atlantic>

³ Data source: MISO [Market Reports](#), Historical Generation Fuel Mix and Historical Regional Forecast and Actual Load.

improve the economics of wind development by increasing market prices overnight and reducing curtailments, which would allow more wind to be added to the grid.



Now is the time to improve these electric vehicle tariffs. As of February 2017, there were over 4,800 plug-in vehicles registered in Minnesota.⁴ Yet the state’s investor-owned utilities have fewer than 100 customers (combined) on their electric vehicle tariffs. The existing tariffs are clearly not attractive to customers. With new and better models coming to the market, we believe Minnesota is poised for a dramatic uptake in electric vehicle sales. If improved tariffs are in place *before* electric vehicle adoption takes off, then customers will be able to set up their new cars to charge during the specific times; customers can “set it and forget it.” This will be much more effective than trying to change customer behavior down the road.

Xcel Energy

Xcel’s electric vehicle tariff, as originally filed, had a major barrier to participation: customers had to pay to have a parallel meter installed—which can cost \$1,000-\$2,000 or more up front—and then pay for the meter through an additional monthly fee. This was a significant deterrent to participation in the tariff.

Xcel is taking steps to address this issue. As Xcel noted in its 2017 Annual Report, it has engaged stakeholders to develop a pilot program that would employ alternative metering options—such as smart chargers with embedded sub-meters—to avoid the prohibitively expensive separate parallel meters.

⁴ Roper, Eric, “With more electric cars coming, Minnesota officials consider charging network,” *Minnesota StarTribune*, July 10, 2017 ([link](#)).

We applaud Xcel Energy's effort to improve its electric vehicle rate offering. As Xcel's Request for Proposals has demonstrated, there are a variety of alternatives to parallel metering, which is needlessly expensive. We look forward to Xcel's upcoming pilot program filing.

Minnesota Power

Minnesota Power's filing provides a description of all of the promotional activities that Company has engaged in over the previous year. We applaud the efforts the Company has made, and we believe they reflect a sincere attempt to increase electric vehicle adoption in Northeastern Minnesota.

However, after nearly two years, there are still no customers on the Company's electric vehicle tariff. This is surprising, considering Minnesota Power's customers would likely benefit the most from an electric vehicle rate. Nearly all of the Company's residential customers are on an Increasing Block Rate, in which customers pay a higher per-kWh rate as their consumption increases. Because switching from a gas car to an electric vehicle would be an additional electric load, the charging would push more of the customer's usage into the higher blocks; in effect, the electric vehicle charging would all be done in the customer's most expensive block, regardless of when in the day the car was charged. This not only provides no incentive for off-peak charging, it also hinders the economics of electric vehicles.

The comments on the Commission's [SpeakUp website](#) suggest an explanation for the lack of participation: the up-front cost of installing parallel metering. As of the initial comment deadline, two of Minnesota Power's customers have posted complaints about the Company's tariff. One customer wrote:

I am interested in signing up for the MP reduced overnight rate for EV charging, but the cost of constructing a new electric line with a separate meter to my garage is prohibitively expensive, somewhere in the neighborhood of \$2000 by two separate estimates. If there were a different way to monitor the electricity I use to charge my car overnight, such as a submetering program, this would be helpful and I would definitely sign up for it.

Pilot program

These customer comments highlight the critical flaw with Minnesota Power's electric vehicle tariff: like Xcel's initial offering, Minnesota Power requires the customer to install a parallel meter to monitor consumption. This means a considerable up-front cost and also a fixed, monthly charge of \$4.25. This additional expense far overwhelms the possible savings from a discounted per-kWh rate. With this impediment, it is easy to see why no customers have signed up for the tariff.

Fortunately, less expensive metering alternatives exist. As ChargePoint noted in its [July 29, 2016 comments](#) in this docket, the [ChargePoint Home](#) “smart charger” contains an embedded submeter capable of tracking the customer’s usage without a separate meter. ChargePoint explained that the embedded submeter “meets or exceeds the requirements set forth in the electricity-as-motor-fuel sections of NIST Handbooks 44 (device code)” and “meet the accuracy requirements of ANSI C12.1-2008 (1% class) as applied to embedded EVSE metering” (at pages 5-6). As Xcel found in the research for its pilot, other options exist, such as monitors that attach to a car’s diagnostic port.⁵

In light of the limitations of Minnesota Power’s current tariff and the availability of alternative technologies, we believe Minnesota Power should pursue a smart charging pilot. Specifically, we recommend the Commission require Minnesota Power to file a proposal for a pilot program on or before its next Annual Report. This timing would provide a clear timeline to guide the development process, while also allowing ample time for Minnesota Power to learn from Xcel’s experience developing and filing its pilot program. Minnesota Power will not need to reinvent the wheel; through its stakeholder and RFP process, Xcel has done a great deal of research already, most of which would be applicable to Minnesota Power.

Minnesota Power’s Annual Report details the significant effort the Company has made toward promoting electric vehicles. We applaud the efforts the Company has made over the past year. While there are no customers on its electric vehicle tariff, we do not believe this is due to a lack of effort. Rather, the failing is in the Company’s tariff.

Tariff hours

While we believe the main deterrent to participation in Minnesota Power’s tariff is the metering requirement, there is another component that could be improved: the duration of the off-peak period. Under Minnesota Power’s current electric vehicle tariff, customers can only charge during a limited time (11pm-7am, daily). This provides little flexibility, which may make the tariff unattractive for some customers.

Notably, this off-peak period is much more limited than that of Minnesota Power’s Residential time of use pilot program.⁶ For this offering—which was approved by the Commission in its [November 30, 2012 Order](#) in Docket 12-233—the off-peak period is 10pm-8am Monday through Friday and all day on weekends and holidays (New Year’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day). For comparison, the

⁵ Since 1996, all vehicles manufactured for sale in the U.S. have been required to have a standardized On-Board Diagnostics (OBD-II) port. Thus, a utility could select a single monitoring device for all tariff participants, regardless of the make and model of their electric vehicle.

⁶ See: Minnesota Power’s Electric Rate Book, page 91 ([link](#)).

off-peak period for the electric vehicle tariff includes 2,920 hours annually, compared to as over 5,000 hours per-year under the time of use tariff, or nearly twice as many hours.

Extending the off-peak period for the electric vehicle tariff would not only make the two tariffs consistent, it would also make the electric vehicle rate much more attractive for customers. We recommend the Commission require Minnesota Power to increase the off-peak period for its electric vehicle tariff to 10pm to 8am Monday through Friday and all day on weekends and holidays, consistent with the Company's Pilot Rider for Residential Time-of-Day Service.

Otter Tail Power

Otter Tail Power's tariff has the same fatal flaw as Minnesota Power's and Xcel's original tariff: customers are required pay a large up-front sum to install a parallel meter and, on top of that, an additional fixed, monthly fee of at least \$4.50. As with the other utilities' tariffs, this burden is unnecessary and could be avoided through a pilot smart charging program.

However, we acknowledge that Otter Tail Power likely has a lower electric vehicle penetration than Minnesota Power and Xcel. We believe there would be value in Otter Tail Power filing a smart charging pilot, but there might also be value in allowing Otter Tail Power to follow the development of Xcel's and Minnesota Power's pilot developments before filing its own. While we believe there is sufficient justification to require Otter Tail Power to propose a smart charging pilot now, the Commission may want to wait until Xcel's and Minnesota Power's pilots have been approved.

EV promotional cost recovery

Whether or not Otter Tail Power is required to file a pilot program, the Company should not be allowed to recover its promotional costs solely through the electric vehicle rate. Currently, Otter Tail Power charges its electric vehicle tariff customers 1.336¢/kWh to recover the cost of the Company's promotional activities. Notably, Otter Tail Power is alone in this practice: neither Xcel nor Minnesota Power collect their promotional costs only from electric vehicle owners. Off-peak electric vehicle charging provides a benefit to all customers, and so it is only fair to recover the Company's electric vehicle promotions from all customers.

Recovering electric vehicle promotional costs only from electric vehicle customers is bad policy because it discourages overnight charging. Adding electric vehicle load only provides a grid benefit if most of the charging occurs overnight during times of low demand. Reduced-rate off-peak charging tariffs provide a financial incentive to customers to encourage this beneficial behavior. By incorporating promotional costs into the rate, Otter Tail Power dramatically increased the electric vehicle charging rate, thus reducing the incentive to charge off-peak: the winter base rate increased by roughly 40% (from 3.3 to 4.7 ¢/kWh) and the summer rate nearly doubled, moving from 1.6 to 3.0¢/kWh. This makes the tariff less attractive and increases the

likelihood that customers will simply stay on the basic tariff and charge during the residential peak.

When it comes to cost recovery, the language of the Electric Vehicle Charging Tariff statute⁷ clearly differentiates between metering costs and promotional costs. The relevant part [Subd. 2 (c)] of the statute states (emphasis added):

The commission may approve the tariff if the public utility has demonstrated that the tariff:

[...]

(2) ***includes a mechanism*** to allow the recovery of costs reasonably necessary to comply with this section, including costs to inform and educate customers about the financial, energy conservation, and environmental benefits of electric vehicles and to publicly advertise and promote participation in the customer-optional tariff;

[...]; and

(4) ***incorporates*** the cost of metering or submetering within the rate charged to the customer.

The highlighted portions demonstrate a crucial distinction between parts (2) and (4). In part (4), the legislature explicitly required the cost of metering to be *incorporated* into the electric vehicle rate. This was a reasonable requirement, as the cost of metering is specific to each individual customer. If, as we recommend, the utilities move to alternative metering—such as embedded submeters in the customer’s smart charger—we believe it would be fair to recover this customer-specific cost from the individual customer. However, when it comes to recovering the cost of electric vehicle promotion, the legislature did not require that these costs be incorporated into rates, but rather required that some *mechanism* be included to allow the Company to recover these costs. Because investor-owned utility promotional practices are scrutinized by the Commission,⁸ the legislature included this part to give explicit permission for cost recovery of these promotional activities, which are beneficial to all customers.

Recovering electric vehicle promotional costs only from electric vehicle customers is also inconsistent with common cost-recovery practices. The costs of electric vehicle promotions are not customer-specific, and off-peak electric vehicle charging provides a benefit to all customers—as illustrated in the MJ Bradley reports. In this way, the electric vehicle tariffs are comparable to interruptible rates and the Conservation Improvement Program (CIP). Interruptible rates and CIP provide specific benefits to certain customers, but they also provide broad benefits to all customers by reducing peak load and resource adequacy requirements. Accordingly, the Commission has consistently allowed utilities to recover the costs of these programs not just from the beneficiaries, but from all customers. In the same way, off-peak

⁷ Minn. Stat. [§ 216B.1614](#).

⁸ See, e.g., Minn. Stat. [§ 216C.19, subd. 4](#), Minn. R. [7849.0120 A\(3\)](#).

electric vehicle charging avoids costly distribution system updates and additional capacity needs; because it provides a benefit to all customers, the costs of promotion should be recovered from all customers.

We recommend the Commission require Otter Tail Power to remove the 1.336¢/kWh rate adder from the electric vehicle tariff immediately. Instead, Otter Tail Power should be allowed to petition for rate recovery for promotional costs from all customers in its next rate case.

Recommendations

Fresh Energy and Minnesota Center for Environmental Advocacy recommend that the Commission:

- Require Minnesota Power to file a proposal for a smart charging pilot on or before June 1, 2018;
- Require Minnesota Power to increase the off-peak period for its electric vehicle tariff to 10pm to 8am Monday through Fridays and all day on weekends and holidays; and
- Require Otter Tail Power to remove the 1.336¢/kWh rate adder from the electric vehicle tariff effective of the date of the Commission's Order.

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