Minnesota Public Utilities Commission

Staff Briefing Papers

Meeting Date: May 21, 2015 ..... **Agenda Item **#8**

Companies: Minnesota Power, Otter Tail Power, and Xcel Energy

Docket Numbers: **E002/M-15-111, E017/M-15-112, E015/M-15-120, E001/M-15-200

In the Matter of Electric Vehicle Charging Tariffs

Issues: Should the Commission approve Interstate Power and Light's proposed Electric Vehicle charging tariff?

Should the Commission approve Minnesota Power's proposed Electric Vehicle charging tariff?

Should the Commission approve Otter Tail Power's proposed Electric Vehicle charging tariff?

Should the Commission approve Xcel Energy's proposed Electric Vehicle charging tariff?

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Relevant Documents

Otter Tail Power, Petition ..... January 30, 2015
Xcel Energy, Petition ..... January 30, 2015
Minnesota Power, Petition ..... February 2, 2015
Interstate Power and Light, Petition ..... March 2, 2015
Environmental Intervenors, Initial Comments ..... March 12, 2015
Otter Tail Power, Initial Comments ..... March 12, 2015
Xcel Energy, Initial Comments ..... March 12, 2015
Department of Commerce, Initial Comments ..... April 13, 2015
Environmental Intervenors, Reply Comments ..... April 23, 2015
Interstate Power and Light, Reply Comments ..... April 23, 2015
Minnesota Power, Reply Comments ..... April 23, 2015
Otter Tail Power, Reply Comments ..... April 23, 2015
Xcel Energy, Reply Comments ..... April 23, 2015

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1. Background

On May 16, 2014, Governor Dayton signed into law Minn. Stat. §216B.1614 (the EV tariff statute), which requires the state's Investor-Owned Utilities (IOUs) to file with the Commission, by February 1, 2015, a tariff allowing a customer to purchase electricity solely for the purpose of recharging an electric vehicle (EV). The full text of the statute is included as Appendix A. Staff highlights the following notable provisions of the statute:

- Utilities may offer either a time-of-use rates or an off-peak only rate;
- The EV tariffs must offer an all-renewable energy option;
- The EV tariffs must be offered to Residential customers, and they may (at the utility's option) be offered to other classes;
- The EV charging rates must incorporate the cost of metering, and tariffs must include a mechanism for recovery of costs reasonably necessary to comply with the statute;
- Utilities must file periodic reports on tariff participation. It is up to the Commission to determine the content and frequency of the reports.

At least one other utility in Minnesota—Dakota Electric—already has an EV charging tariff, which was approved by the Commission in Docket No. 12-874. In addition, in 2013 the Commission hosted an informational smart grid workshop focused on EV deployment and its role in the utilities' distribution system.[1] At the EV workshop, common issues included: where customers would charge their vehicles, at what rate, and how distribution system costs would be borne. All presenters acknowledged the importance of load management by creating incentives to encourage off-peak usage, believing it to be a win-win for the utility and the customer.

2. Overview of the Briefing Papers

These briefing papers begin with a high-level comparison of the major features of the proposed tariffs (Section 3). This is followed by a closer look at each individual tariff (Section 4). Section 5 discusses additional issues open for Commission consideration, and Section 6 presents decision options. The full text of the EV tariff statute is included as Appendix A. Additionally, for those interested in learning more about EVs, a Staff comment on the potential for EVs in Minnesota is included as Appendix B.

[1] More information on the EV smart grid workshop—including slides from the presentations—can be found on the Commission's website: link

3. Comparison of Tariff Proposals

Table 3.1 highlights some of the key features of the utilities' proposed EV tariffs.

Table 3.1 Comparison of proposed EV tariffs

	MP	OTP	Xcel
Fixed monthly charge	$4.25	$4.50	$4.95
Off-peak charging			
Off-peak hours	11 pm to 7 am	10 pm to 6 am	9 pm to 9 am
Summer off-peak rate	4.332 ¢/kWh	2.962 ¢/kWh	3.3 ¢/kWh
Winter off-peak rate	4.332 ¢/kWh	4.661 ¢/kWh	3.3 ¢/kWh
On-peak charging			
On-peak hours	*No on-peak charging*	*No on-peak charging*	9 am to 9 pm
Summer on-peak rate			17.564 ¢/kWh
Winter on-peak rate			14.17 ¢/kWh
All-renewable premium	2.5 ¢/kWh	1.3 ¢/kWh	0.68¢/kWh

As the Table displays, there is considerable variation across the tariff proposals. Xcel's proposal allows for both off- and on-peak charging, though with a considerable increase in the on-peak rate, while MP's and OTP's proposed tariffs only allow charging during off-peak hours. The number of hours available for off-peak charging also varies: Xcel's proposal allows off-peak charging for 12 hours a day on weekdays and all day on weekends and holidays; MP and OTP, on the other hand, only allow off peak charging for 8 hours a day—including weekends and holidays—throughout the year. The premiums for the all-renewable energy options are also very different, because the proposed all-renewable rates are based on the utilities' existing green pricing programs, which have been revisited to varying degrees since their inception in 2001. MP's renewable premium roughly twice as large as OTP's premium and nearly four times larger than Xcel's average premium; for comparison, Dakota Electric's green pricing program (Wellspring) has a premium of 0.4¢/kWh, or less than one sixth of MP's premium.

4. Proposed Electric Vehicle Charging Tariffs

4.1 Interstate Power and Light

The EV tariff statute only applies to IOUs. Since IPL's petition and comments were filed, the Commission approved the sale of IPL's electric assets in Docket No. E001/PA-14-322. Accordingly, it will now be up to the individual cooperatives to determine whether or not to offer off-peak EV charging tariffs. In Section 6, Staff includes a decision option to officially close IPL's EV tariff docket.

4.2 Xcel Energy

Xcel's proposed EV tariff is a time-of-use offering, which is similar to its existing Residential Time-of-Day Service option, and it will be available to its residential customers. Unlike MP's

and OTP's tariffs, Xcel's proposal allows for EV charging at all hours of the day. During the off-peak period—defined as 9 p.m. to 9 a.m. Monday through Friday and all day on weekends and holidays—the proposed rate is 3.3¢/kWh, while the on-peak rate is 17.564¢/kWh from June through September and 14.17¢/kWh from October through May. Xcel's proposed additional customer charge of $4.95 a month is the highest of the three proposed tariffs. The Company noted that the charge is the same as its Energy Controlled Service (Non-Demand Metered) tariff and its Limited Off Peak Service, both of which "have the same incremental metering and billing cost requirements" as its EV tariff customers.[2] For its renewable energy-sourced option, Xcel proposed to use its existing green pricing tariff, the Voluntary Renewable and High-Efficiency Energy Purchase Rider (Windsource program). The premium is 3.53¢/kWh[3] minus a credit to adjust for system energy fuel cost savings; in 2014, the average net premium was 0.68¢/kWh.[4]

The Department recommended approval of Xcel's proposed EV tariff.

Staff Comment

Staff notes that the rates Xcel proposed for its EV tariff differ from those of its Residential Time-of-Day (TOD) Service offering. As the table[5] below displays, Xcel's proposed EV rates are higher than the TOD rates during off-peak hours and lower during on-peak hours; under its TOD tariff, customers pay 3.5 times more for energy consumed during on peak hours, while under Xcel's proposed EV tariff, the on-peak rate is only 3 times higher than the off-peak rate. In its petition, Xcel explains that it settled on this 3:1 on- to off-peak ratio as a midpoint between its forecasted marginal energy costs, with an on- to off-peak ratio of 2.6:1, and its current Residential TOD ratio of 3.5:1.

Development of Proposed Residential EV Service Base Energy Charges*

	Usage Percent	Summer Base	Winter Base	Annual Average Base	Annual Average Fuel	Annual Average Total
Residential	100.0%	**8.671**	**7.393**	7.819	2.711	10.530
Residential TOD						
On	37.7%	**18.524**	**15.130**	16.261	2.711	18.973
Off	62.3%	**2.720**	**2.720**	2.720	2.711	5.431
Ave	100.0%	8.671	7.393	7.819	2.711	10.530
On/Off Ratio						3.5
EV TOD						
On	37.7%	**17.564**	**14.170**	15.301	2.711	18.013
Off	62.3%	**3.300**	**3.300**	3.300	2.711	6.011
Ave	100.0%	8.671	7.393	7.819	2.711	10.530
On/Off Ratio						3.0

*Based on compliance filing in Docket No. E002/GR-12-961

Staff believes the EV tariff statute's goal is to encourage customers to shift their EV charging to off-peak hours. This modification, however, weakens the incentives for shifting load off-peak.

[2] Xcel Energy, Petition, January 30, 2015, at page 7.

[3] Like MP and OTP, Xcel's current green pricing program does not necessarily charge a premium on *all* of a participant's usage. Rather, customers buy as many 100 kW "blocks" of renewable energy they want for a given month. Staff presents the renewable premiums in ¢/kWh to aid comparisons with on- and off-peak rates.

[4] Xcel Energy, "Windsource Minnesota- Frequently Asked Questions" (link).

[5] Source: Table 2 from Xcel Energy's January 30, 2015 Petition, at page 7.

In its 2013 rate case, Xcel changed its methodology for calculating TOD rates in order to send *stronger* price signals to TOD customers; this modification would *weaken* price signals by reducing the incentive to charge off-peak and decreasing the disincentive to charge on-peak.[6] Moreover, in its Petition, Xcel provides an analysis of EV charging rates around the country. This analysis found that Xcel's proposed EV tariff rates would send weaker price signals (on- to off-peak rate ratio of 3:1) than the national average (3.41:1) and much weaker price signals than the average for other northern states (4.24:1).[7]

4.3 Minnesota Power (MP)

MP's EV tariff proposal is based on its Residential Controlled Access Electric Service tariff. As proposed, the EV tariff is for off-peak charging only, between the hours of 11 p.m. and 7 a.m., daily. The proposed EV rate is 4.332¢/kWh (plus a "fuel and purchased energy adjustment") with a monthly customer charge of $4.25. For the renewable energy-sourced option, MP's proposal uses its existing green pricing program, the Rider for Residential/General Service Renewable Energy, in which customers pay a premium of 2.5¢/kWh.

The Department recommended approval of Minnesota Power's tariff.

The Environmental Intervenors (EI) took issue with the off-peak definition in MP's proposed EV tariff. Not only is MP's off-peak period (8 hours) shorter than Xcel's (12 hours) during the week, MP also considers weekends and holidays on-peak, so that EV customers can still only charge during the evenings. In EI's words:

> EV drivers and EV advocacy voices have advised Xcel that many EV drivers will want to use their vehicles for errands and local travel during the weekend days, and still have a full charge for evening weekend use. In addition, Xcel' s timing of its off-peak rate was informed by its discussions with actual EV drivers. Minnesota Power should adopt the same schedule and hours as Xcel, especially if there is any serious contemplation of joint efforts to educate consumers and promote EV use.[8]

In response, the Department, MP, OTP, and Xcel argued that it is appropriate for utilities to have different on- and off-peak periods. These parties contend that each utility has unique load characteristics and resource costs. As an example, the Department pointed to MP's high concentration of large industrial customers. These differences, the parties argue, make "harmonized" on- and off-peak designations inappropriate.

In its reply comments, the EI conceded the arguments made by the other parties and withdrew its recommendation to harmonize on- and off-peak hours for Xcel and MP.

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[6] Docket No. 12-961. In this docket, Xcel proposed to use the forecast marginal energy cost ratio for summer months only, which reduced the off-peak rate and increased the on-peak rate.

[7] Xcel Energy, Petition, January 30, 2015, Attachment B, pages 23-25. Staff used Minnesota and Michigan utilities to calculate northern states' average.

[8] Environmental Intervenors, Initial Comments, March 12, 2015, at page 3.

Staff Comment

Off-peak Definition

The majority of the arguments against expanding MP's off-peak hours were focused on the number and timing of off-peak hours per day. Minnesota's IOUs, the parties argued, have different load characteristics, and so it is appropriate for them to have different on- and off-peak hours during the week.

This argument does not, however, necessarily follow to weekends and holidays. The parties have not presented evidence that their load profile is the same during weekends and holidays as it is during weekdays. Just as some drivers find it more convenient to wait until the weekend to fill their gas tanks, EV drivers may find it more convenient to charge more on the weekends; this will become more likely as the driving ranges increase to the point where most EV drivers will only need to charge once or twice a week. In addition, recharging larger EV batteries on 120 volts can be a lengthy process. Depending on the vehicle, 120-volt (Level 1) charging typically delivers about 1 to 1.5 kilowatts of power per hour. This means that a fully depleted 24 kWh battery (such as in a Nissan Leaf) could require a range of 16-24 hours to recharge using a regular 120-volt household line. Of course, it would probably be rare for customers to fully deplete their batteries before recharging them, and Staff believes most EV owners will purchase faster (240-volt, Level 2) chargers; but the point is that, since MP's proposed rate only allows service for 56 hours per week—and that service is available only in the late evening and early morning—it could be inconvenient (and insufficient) for some.

Staff also notes that the definition of off-peak MP proposes for its EV tariff is different than the off-peak period approved for its Pilot Rider for Residential Time-of-day Service.[9] In that docket, the Company proposed an off-peak period of 10 p.m. to 8 a.m. Monday through Friday and all day on weekends and holidays.[10] If this definition were applied to MP's EV tariff, its customers would have roughly 2,242 more hours available for charging per year, or 43 additional hours per week. This would make the EV tariff much more attractive to prospective customers.

In its reply comments, MP argued against extending its off-peak period to all days on weekends and holidays. As the Company put it:

> The Company believes the administrative costs associated with this change are not warranted at this time based on the low saturation of EVs in its service territory. The Company would be open to revisiting this when and if EVs become more popular in this area.[11]

MP did not specify why administrative costs would be higher if it extended off-peak hours.

MP's Renewable Premium

MP's additional energy charge of 2.5¢/kWh for customers who choose the renewable energy option is based on the Company's existing Wind Energy Surcharge of $2.50 per 100 kWh block of renewable energy available for purchase through the voluntary Rider for Residential/General

[9] Docket No. E015/M-12-233.
[10] See Minnesota Power's March 20, 2012 filing in Docket No. E015/M-12-233.
[11] Minnesota Power, Reply Comments, April 23, 2015, at page 2.

Service Renewable Energy (i.e. WindSense). This proposed renewable premium, for the EV rate, would be a 57 percent increase to MP's default EV off-peak energy rate of 4.332¢/kWh.

Assuming an MP customer's EV charging consumes 400 kWh/month, the total bill impact (including the monthly fixed charge) would be $21.58 on the default rate. On the renewable energy rate, however, the EV customer's bill impact would be $31.58, a 46 percent increase. EI cautions the Commission against adopting renewable options which result in a premium and discourage sign-ups for the renewable rate. EI notes that MP's existing green pricing program "is offered to its 144,000 residential and commercial customers but fewer than 600 opt for it."[12] EI argues the intent of the EV statute is to integrate electric vehicles in a way that is consistent with overall state energy goals.

4.4 Otter Tail Power (OTP)

OTP's EV tariff proposal is modeled after its Fixed Time-of-Service Rider. Like MP, OTP's EV tariff is for off-peak charging only, with the off-peak period defined as 10 p.m. to 6 a.m., daily.[13] Unlike MP and Xcel, OTP will offer its EV tariff to all customer classes, not just the Residential class. For most customers, the monthly customer charge would be $4.50.[14] For the renewable energy-sourced option, OTP proposed to use its existing green pricing tariff, the Voluntary Renewable Energy Rider (the TailWinds Program), which is a premium of 1.3¢/kWh.

To develop its off-peak EV charging rate, OTP began with the off-peak rate for its Fixed Time-of-Service Rider and added a per-kWh premium to recover its estimated advertising and promotion costs.[15] The results can be seen in the table[16] below, where columns (B) and (C) represent the off-peak rate for the Fixed Time-of-Service Rider, column (D) is the estimated per-kWh promotional costs, and columns (E) and (F) are the total EV charging rates.

Table 4.1 Otter Tail Power's proposed off-peak EV charging rates

(A)	(B)	(C)	(D)	(E)	(F)
Season	**Fixed TOS Self-Contained and CT Metering**	**Fixed TOS Primary CT Metering**	**EV Cost Recovery**	**Off-Peak EV Rider Self-Contained and CT Metering**	**Off-Peak EV Rider Primary CT Metering**
Summer	1.626¢/kWh	1.62 ¢/kWh	1.336¢/kWh	2.962¢/kWh	2.956¢/kWh
Winter	3.325¢/kWh	3.312 ¢/kWh	1.336¢/kWh	4.661¢/kWh	4.648¢/kWh

With a modification to the proposed promotional cost recovery—discussed in Section 5.1, below—the Department recommended approval of OTP's proposed EV tariff.

Staff Comment

Off-peak Definition

The Environmental Intervenors directed their comments on "harmonizing" off-peak periods only to MP and Xcel. However, Staff notes that OTP's proposed off-peak period (10 p.m. to 6 a.m.,

[12] Environmental Intervenors, Initial Comments, March 12, 2015, at page 3.
[13] EV charging outside of these hours would result in a penalty of 5.676¢/kWh (summer) or 3.605¢/kWh (winter).
[14] This is the customer charge for self-contained metering; a customer with CT metering or primary CT metering would pay a monthly customer charge of $18 or $13, respectively.
[15] Promotional cost recovery is discussed in Section 5.1, below.
[16] Source: "Table 1: Summary of EV Rider Rate Design Components," from page 5 of Otter Tail Power's January 30, 2015 Petition. Staff altered column F to include OTP's proposed promotional cost recovery.

daily) is nearly identical to to MP's (11 p.m. to 7 a.m., daily). If the Commission decides to extend the off-peak period for MP's EV tariff, it may want to consider doing the same for OTP's.

5. Additional Issues

5.1 Promotional Cost Recovery

The EV tariff statute, at subd. 2(c), requires "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."

As proposed, the EV tariffs take three different approaches to cost recovery. MP did not request recovery of any promotional costs at this time because of "the current low saturation of electric vehicles in the Company's service territory."[17] Instead, MP plans to use its website and customer newsletter to inform customers of its EV tariff.[18] MP did state that it would request cost recovery in the future if it does incur significant advertising costs. Thus, MP's cost recovery mechanism is to monitor its promotional costs for now, and, if necessary, to pursue cost recovery in a future rate case. To recover its EV promotion and advertising costs, Xcel recommended establishing a tracker account mechanism for recording its EV communications costs and deferring recovery to a later proceeding.[19] Xcel argues this is the most appropriate approach given the uncertainty in both the cost of marketing plans and the general EV adoption and per-EV customer charging. OTP's approach was to develop estimates of its future promotional costs and EV tariff participation, and then to build the promotional costs into the EV rate from the start. Specifically, OTP estimated its promotional costs would be $17,172 over five years; when compared to its estimates of program participation, this translates into a rate increase of 1.336¢/kWh over what the EV rate would otherwise be.[20]

Overall, the Department favored Xcel's approach of establishing a tracker account. In addition to recommending approval of Xcel's tracker, the Department also recommended OTP establish a tracker account for its development and promotional costs. In the Department's words, "Given the lack of market penetration by electric vehicles, and the generally rural nature of OTP's service territory, use of a tracker will allow the Company additional information on the extent of customer participation and usage under the EV Rider."[21] The Department recommended that the 1.336¢/kWh EV cost recovery charge be removed from OTP's EV rate initially, and the development and promotional tracker account be revisited after the tariff has been in place for one year.

In its reply comments, OTP took issue with the Department's recommendation for a tracker account instead of recovering projected promotional costs in the EV rate from the outset. OTP

[17] MP Initial Filing, p. 5.
[18] IPL's proposal also took a similar approach. See IPL, Petition, March 2, 2015, at page 6.
[19] Xcel also noted that off-peak EV charging is also available through the Company's existing Residential Service and Residential TOD Service tariffs. Thus, it may not be appropriate to recover all EV promotional communications through the EV tariff. If the Commission adopts Xcel's tracker proposal, these cost allocation issues will need to be addressed when Xcel petitions for recovery.
[20] OTP's calculation of its estimated promotional costs can be found on pages 6-7 of its January 30, 2015 Petition.
[21] Department of Commerce, Initial Comments, April 13, 2015, at page 5.

argues that the Department's proposed tracker approach will make the rate appear artificially low initially, which may appear to customers to be a "bait-and-switch" tactic. OTP believes its promotional cost estimates are both reasonable and easily adjusted: if the estimates turn out to be too low, the Company can petition for recovery of the balance; if the estimates are too high, the Company can petition to remove the cost-recovery premium before the end of the five-year period. Moreover, the Company argues that its EV charging rate is competitive, even with the proposed promotional costs built-in.

Staff Comment

Staff identifies four dominant issues underlying the parties' promotional cost recovery recommendations:

1. Uncertainty in the electric vehicle energy sales forecasts;
2. Administrative burden or simplicity;
3. The interpretation of the word "mechanism" for rate recovery; and
4. The impact on the final EV charging rates.

As discussed above, three utilities take three different approaches to rate recovery. MP's approach, to wait to make a request for cost recovery until costs become known and significant, might be the easiest option to employ, and the Commission could monitor EV-related costs through the periodic data reports. Xcel's approach separates the promotional costs from energy rate, but leaves the amount of total promotional costs unknown. OTP's approach applies a known budgetary amount, but in doing so, raises the energy rate by 1.336¢/kWh, which is a significant portion of the total per-unit charge.

A limitation of OTP's approach is that it is based on several unverified assumptions which materially influence (and increase) the per-kWh rate. OTP's total budget, $17,172, is divided by an estimate of cumulative EV energy sales—totaling 100 electric vehicles by year five—and recovered over a period of five years. Staff is not certain how OTP arrived at its total budgeted amount, or why recovery over five years is preferable to some other term.

In addition, OTP's total budget for advertising and promotion, $17,172, may not be significant enough, or certain enough, to necessitate creating a tracker account in this case, as the Department recommends. It could create more administrative burden and perhaps more regulatory costs than necessary, if Company staff, Department staff, Commission staff, and then the Commission must review, approve, or make changes to the tracker account.

In addition, if the Commission were to approve OTP's proposal to build the estimated costs into its EV rate, it would be making a finding that the costs of promoting the rate should be recovered only from EV customers, rather than from all customers or some other subset of customers. This is different than the approach proposed by Xcel, which does not plan to confine promotional cost recovery only to those on the Residential EV Service tariff.[22] Staff believes the statute is open to interpretation on this point. On the one hand, the statute expressly requires metering costs be *incorporated* into the EV rate, but only requires a "mechanism" for recovery of promotional costs, without saying these costs need to be incorporated into the EV rate. In addition, one could argue that, since shifting EV charging load off-peak will benefit all customers, it is appropriate to

[22] See Xcel Energy, Petition, January 30, 2015, at page 9.

recover promotional costs from a wider subset of customers. On the other hand, EV tariff customers are already receiving a benefit for shifting their charging off-peak, as they will pay considerably lower rates. In light of this benefit, one could argue it is appropriate to build all promotional costs into EV charging rates in order to leave other customers unharmed. Ultimately, it is up to the Commission to determine which approach is more appropriate.

In Xcel's case, its proposal would not actually collect any costs in the EV rate or through another mechanism at this time, but the costs would accumulate for possible future recovery. One limitation of this approach is that the Commission has no idea, at present, as to what this amount could potentially be. It appears that Xcel is requesting that the EV-related costs it records to its tracker would be recovered in a future rate case or other relevant proceeding, which is essentially a request for deferred accounting. While Xcel's tracker proposal would not guarantee recovery of all spending included in the tracker account, it would allow all costs, including out of test-period costs to be included, subject only to a determination of whether the tracked expenses were "reasonably necessary" to comply with the EV tariff statute.[23]

If the Commission is uncomfortable granting Xcel's request for deferred accounting, it could choose another promotional cost recovery mechanism. Xcel did not make an estimate of its total budget for advertising and promotion, so building an amount into the EV rate as OTP did is not an option based on the record to-date. However, the Commission could take no action on cost recovery at this time, as was MP's approach. Given the low penetration of EVs and the unknown level of promotional costs, it would be reasonable to monitor promotional costs for now—perhaps through the utilities' annual EV tariff reports—and make a recovery determination in a future rate case or in a future separate proceeding if the costs become more predictable and significant.

Finally, Staff believes it is important to consider the impact promotional costs will have on the final EV charging rates, should the Commission decide that these costs should be recovered only from EV customers on the rate. While the amount OTP seeks to recover is relatively small ($17,172), if it is assigned only to EV tariff customers, it will likely be spread out over a small number of kWh. As OTP itself admits, future EV tariff participation is difficult to estimate. Using OTP's participation estimates, the per-kWh increase (1.336¢/kWh) is already substantial. If it turns out OTP overestimated EV tariff participation, the rate could increase even more, as the denominator (EV energy sales) would be smaller: if OTP adds five fewer EV tariff customers per year, the promotional cost rate increase would need to be 1.9¢/kWh, which is larger than its proposed base rate for summer EV charging.

Staff believes the most effective promotion for the EV tariff will be as low rates as reasonably possible. As EV adoption is currently low, excessive spending on promotion will increase EV charging rates, likely with limited participation increases. Staff notes that the statute requires recovery only of costs that are "reasonably necessary to comply" with the statute. If the Commission would like further information on anticipated promotional costs, Staff recommends requiring a compliance filing, in which utilities describe their promotional plans, including: an estimate of promotional spending and its impact on the EV charging rates; an explanation of the assumptions underlying these estimates; and a discussion of why the promotional spending is "reasonably necessary" to comply with the EV tariff statute.

[23] See Minn. Stat. §216B.1614 Subd. 2(c)(2)

5.2 All-Renewable Energy Option

The EV tariff statute requires the tariff to offer an "option to purchase electricity entirely from renewable energy sources, subject to the conditions established under section 216B.169," which is the statute under which utilities launched their Voluntary Renewable Energy Riders in 2001 (WindSource, TailWinds, and WindSense for Xcel, OTP, and MP, respectively). Each of the utilities proposed to use its existing green pricing tariff for the all-renewable option in its EV tariff. As shown in Table 3.1 above, customers who choose the renewable energy option would pay an additional amount above the proposed applicable rate in the EV Rider: MP customers would pay an additional 2.5¢/kWh, OTP's customers would pay an additional 1.3¢/kW, and Xcel's customers would pay 3.53¢/kWh minus a fuel credit, with an average net premium of 0.68¢/kWh in 2014.

EI argues the integration of EVs needs to be considered in light of Minnesota's broader energy goals. Specifically, EI points to the State's greenhouse gas reduction (GHG) goals, which aim to reduce GHG emissions across all sectors by at least 80 percent below 2005 levels by 2050.[24] Because EVs powered by renewable energy will have considerably lower GHG emissions than EVs run on fossil fuels, EI argues it is "critical that the terms of the EV tariff promote the all-renewable tariff option to the greatest extent practicable."[25]

EI makes two recommendations for the renewable energy-source option. First, EI recommends the Commission establish a new all-renewable rate, which reflects current wind prices, that is specific to the EV tariffs. As EI notes, the current green pricing tariffs were developed in the early 2000s, and are based on the prices of wind PPAs procured at that time. But, EI argues, since the cost of wind power has fallen considerably since then, the utilities' current green pricing rates are out of date. While it would be simpler and more convenient to simply use the existing rates, EI argued that "convenience alone is not a sufficient reason for starting the program at a higher rate than necessary."[26] Accordingly, EI recommends the Commission "[o]rder a new analysis of an all-renewable option for this tariff based on a modern wind turbine on the best available site."[27] Second, once the green pricing rates have been recalculated, EI contends the green pricing option should be the default in each EV tariff, so that customers would need to opt-out of the renewable option rather than opt-in to it.

The Department did not object to EI's recommendation to make the all-renewable option the default rate, provided customers "are made fully aware that the rate includes green pricing."[28] The Department argued that many of the early EV adopters will choose to purchase an EV for their environmental benefits, and so they will likely be amenable to the renewably sourced rate.

The Department did not explicitly address EI's recommendation on a new green pricing rate for the EV tariffs, but the Department did argue that using the existing green pricing programs "is administratively simple, and would ensure rate consistency with other customers purchasing renewable energy through the green pricing program."[29]

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[24] Minn. Stat. § 216H.02.
[25] Environmental Intervenors, Initial Comments, March 12, 2015, at page 2.
[26] Environmental Intervenors, Reply Comments, April 23, 2015, at page 2.
[27] Environmental Intervenors, Initial Comments, March 12, 2015, at page 4.
[28] Department of Commerce, Initial Comments, April 13, 2015, at page 3.
[29] Ibid, at page 3.

MP, OTP, and Xcel opposed EI's recommendation to develop a new green pricing rate for the EV tariffs. MP argued that it was not justified given the current level of EV penetration. OTP and Xcel argued using existing green tariff premiums would be administratively simple and consistent. MP added that, should the Commission choose to develop a new green pricing rate, it "should consider the complete mix of all renewable resources, including hydro and biomass, in the Company's portfolio, and not be limited to wind."[30] If all of these were considered, MP argued the new all-renewable rate would not necessarily be less expensive than MP's current premium of 2.5¢/kWh.

Staff Comment

If the Commission is persuaded that it is appropriate to establish a new all-renewable rate specific to the EV tariffs, Staff believes EI's proposal for a new all-renewable rate specific to the EV tariff is a possibility. Staff notes that, in discussing the all-renewable option, the EV tariff statute does not *require* the use of a utility's existing green pricing tariff, but rather it requires the rate to comply with certain provisions of the green pricing rate statute.[31] Thus, Staff believes the EV tariff statute contemplates the development of a new all-renewable rate, provided it complies with these provisions.

However, while EI's comments provide considerable discussion on the value of establishing a new all-renewable rate, there is relatively less discussion of the process for establishing the rate calculation methodology. Subdivision 2 of the Voluntary Renewable Energy Rider statute requires that rates charged to customers "must be calculated using the utility's cost of acquiring the energy" and "must reflect the difference between the cost of" acquiring new renewable energy versus the energy cost that would otherwise be incurred. While comparing one price with another is simple conceptually, in practice establishing a methodology for the calculation would require several contentious decisions.

Staff believes more information is necessary for the Commission to establish a new all-renewable rate for the EV tariffs. Staff offers two possible means for further record development: first, EI could file a more detailed proposal for an all-renewable rate calculation methodology, which all parties could then comment on. A second option is to order the utilities to convene a stakeholder meeting to discuss a rate calculation methodology. If the parties are able to come to consensus, they could submit the proposal for Commission approval; if they are unable to make an agreement, the Commission could then open a comment period specific to the new all-renewable rate calculation. Staff encourages parties to discuss these options and/or provide additional alternatives during their comments at the upcoming agenda meeting.

Additionally, Staff notes that a new all-renewable rate for the EV tariffs would not necessarily affect the utilities' existing green pricing rates. EI itself stated that its comments "are not meant to implicate the cost-effectiveness of the current WindSource program, or other utilities' green pricing programs."[32] The existing green pricing rates were based on the price of wind PPAs at the program's inception; while wind PPA prices have fallen since then, the existing green pricing

[30] Minnesota Power, Reply Comments, April 23, 2015, at page 3.
[31] See Minn. Stat. 216B.1614, subd. 2(a)(2)(ii).
[32] Environmental Intervenors, Reply Comments, April 23, 2015, at page 3.

rates are, at least in part, still paying off the original PPA prices. If the cost of the original PPAs is not collected through the existing green pricing programs, the balance of the PPA costs would have to be collected from *all* of the utility's customers, which would raise fairness issues.

5.3 Periodic Reports

Subdivision 3 of the EV tariff statute requires each utility to provide periodic reports to the Commission. These reports must include the number of customers taking service under the tariff and the amount of electricity sold under the tariff, and the reports may include any additional information required by the Commission. Thus, the Commission will need to decide what, if any, additional information to be included in the reports, and when the reports should be filed.

What should be included in the reports?

In addition to the number of customers and the total electricity sales, parties recommended the following additional information be included in the reports:

- The amount of energy sold in on- and off-peak periods, if applicable (Department of Commerce, Xcel Energy)
- A brief description of all development and promotional activities and their costs (Department of Commerce)
- The number of customers choosing the renewable-source option (Xcel Energy)
- The status of the communications costs tracker account (Xcel Energy)
- Current wind turbine pricing data and a demonstration of how these prices compare to facilities used for the utility's existing green pricing program. (Environmental Intervenors)

When should the reports be filed?

The EV tariff statute leaves it to the Commission to decide when and how frequently the reports should be filed. All parties expressed a preference for annual, rather than quarterly reports. There was not, however, agreement on when in the year the report should be filed: Xcel suggested the end of the first quarter, while Minnesota Power suggested June 1st, as it would "ensure final data from the Company's FERC Form No. 1, which is completed in mid-April each year, would be available for preparation of the report."[33] Staff requests that parties devote a portion of their comments at the agenda meeting to the appropriate deadline for the filings.

Staff Comment

If the Commission seeks to monitor EV-related costs over time, if the Commission believes the record (and tariffs) could benefit from additional technical and financial details, and especially if the Commission seeks to modify the proposed EV rates at this time or at some time in the future, the EV reports would be a valuable resource for doing so. In the Commission's approval of Minnesota Power's critical peak pricing pilot, for example, the Commission required MP to file, among several other things:

- Communications with customers about the rate modification and its financial impact;
- A privacy policy explaining in detail all data collected and permissible uses; and
- Information on customer participation, usage levels, narratives, and bill impacts.

[33] Minnesota Power, Petition, February 2, 2015, at page 6.

Also, one limitation of the utilities' filings (which is not to say a fault) is that they are proposals, not scenarios. In other words, there is no quantitative experimentation with alternative rate designs, such as how changes to the duration of on-peak and off-peak periods could impact the energy charges or how different rate structure could impact utility revenue. If the Commission desires to revisit EV charging rate design at some point in the future, the reports could provide a meaningful interim step toward more detailed financial analyses of alternative rate structures.

In MP's Residential TOU pilot docket, the Commission required MP to file the privacy policy in its tariff, which Staff has included as a decision option here. Staff has also included a decision option delegating authority to the Executive Secretary regarding the review of EV customer materials. This delegation and requirement was ordered in MP's TOU filing, but not in DEA's EV tariff filing.

6. Decision Options

Interstate Power and Light

1. Close docket E001/M-15-200 and take no action on IPL's tariff filing.

Xcel Energy

2. Approve Xcel Energy's Residential Electric Vehicle Charging Tariff as proposed in the Company's January 30, 2015 filing. (Xcel, the Department)

3. Approve Xcel Energy's Residential Electric Vehicle Charging Tariff as proposed in the Company's January 30, 2015 filing *with one or more of the following modifications*:

    a. Align the EV charging rates with the Company's existing Residential TOD rates by decreasing the off-peak charging rate to 2.720¢/kWh and increasing the on-peak rates to 18.524¢/kWh for the summer and 15.130¢/kWh for the winter.

    b. Deny Xcel's request to defer promotional cost recovery and record promotional expenses in a separate tracker account. Direct the Company to address cost recovery in its EV tariff reports and its future rate cases.

    c. Require the Company to file a privacy policy explaining in detail all data collected and permissible uses of that data.

4. Reject Xcel Energy's proposed Residential Electric Vehicle Charging Tariff.

Minnesota Power

5. Approve Minnesota Power's Residential Off-Peak Electric Vehicle Service tariff as proposed in the Company's February 2, 2015 filing. (MP, the Department)

6. Approve Minnesota Power's Residential Off-Peak Electric Vehicle Service tariff as proposed in the Company's February 2, 2015 filing *with one or more of the following modifications*:

    a. Extend the off-peak period to include all hours on weekends and holidays.

    b. Extend the off-peak period to 10 p.m. to 8 a.m. on weekdays.

    c. Require the Company to file a privacy policy explaining in detail all data collected and permissible uses of that data.

7. Reject Minnesota Power's proposed Residential Off-Peak Electric Vehicle Service tariff.

Otter Tail Power

8. Approve Otter Tail Power's Off-Peak Electric Vehicle Rider as proposed in the Company's January 30, 2015 filing. (OTP)

9. Approve Otter Tail Power's Off-Peak Electric Vehicle Rider as proposed in the Company's January 30, 2015 filing *with one or more of the following modifications*:

    a. Remove from base rates OTP's proposed 1.336¢/kWh estimated cost for development and promotional activities. Authorize the Company to establish a tracker account for up to three years, without interest and beginning on the date of this order, for its EV customer education and promotional costs that are reasonably necessary to comply with Minn. Stat. § 216B.1614. The Company may apply for recovery of expenses under this statute in its next rate case or within three years, whichever is sooner. (the Department as interpreted by Staff)

    b. Remove from base rates OTP's proposed 1.336¢/kWh estimated cost for development and promotional activities. Direct the Company to address cost recovery in its EV tariff reports and its future rate cases.

    c. Extend the off-peak period to include all hours on weekends and holidays.

    d. Extend the off-peak period to 10 p.m. to 8 a.m. on weekdays.

    e. Require the Company to file a privacy policy explaining in detail all data collected and permissible uses of that data.

10. Reject Otter Tail Power's proposed Off-Peak Electric Vehicle Rider.

All-Renewable Energy Option

11. Use each utility's existing green pricing tariff rate for its all-renewable option. (the Department, MP, OTP, Xcel)

12. Order each utility to provide a new analysis of an all-renewable option for this tariff based on a modern wind turbine on the best available site. (Environmental Intervenors)

13. Request that the Environmental Intervenors file a proposal for a new all-renewable rate specific to the EV tariffs. This proposal should include a detailed methodology for the rate calculation.

14. Order the utilities to convene, within 60 days of the Order in these dockets, a stakeholder meeting to discuss the methodology for the calculation of a new all-renewable rate specific to the EV tariffs.

Promotional Plans

15. Order each utility to file, within 60 days of the order in these dockets, a compliance filing describing its promotional plans, including: an estimate of promotional spending and its impact on the EV charging rates; an explanation of the assumptions underlying these estimates; and a discussion of why the promotional spending is "reasonably necessary" to comply with the EV tariff statute.

Periodic EV Reports

16. Direct each Investor-Owned Utility to file in its EV tariff docket an EV Tariff Report annually, *by June 1st* of the following year. (MP)

17. Direct each Investor-Owned Utility to file in its EV tariff docket an EV Tariff Report annually, *by the end of the first quarter* of the following year. (Xcel)

18. In addition to the statutorily required information—the number of customers on the EV tariff and total electricity sales—direct each Investor-Owned Utility to include, on a per-quarter basis, the following information in its reports:

    a. The amount of energy sold in on- and off-peak periods, if applicable; (the Department, Xcel)

    b. A brief description of all development and promotional activities and their costs; (the Department)

    c. The number of customers choosing the renewable-source option; (Xcel)

    d. The status of the communications costs tracker account, if applicable; (Xcel)

    e. Current wind turbine pricing data and a demonstration of how these prices compare to facilities used for the utility's existing green pricing program. (Environmental Intervenors)

    f. Copies of any EV promotional materials distributed to customers; (Commission Staff)

    g. A privacy policy explaining in detail all data collected and permissible uses.

Appendix A: EV Tariff Statute

2014 Minnesota Statutes
216B.1614 ELECTRIC VEHICLE CHARGING TARIFF.
Subdivision 1.Definitions.

(a) For the purposes of this section, the terms defined in this subdivision have the meanings given them.
(b) "Electric vehicle" has the meaning given in section.
(c) "Public utility" has the meaning given in section 216B.02, subdivision 4.
(d) "Renewable energy" has the meaning given in section 216B.169, subdivision 2, paragraph (d).

Subd. 2.Required tariff.

(a) By February 1, 2015, each public utility selling electricity at retail must file with the commission a tariff that allows a customer to purchase electricity solely for the purpose of recharging an electric vehicle. The tariff must:
  (1) contain either a time-of-day or off-peak rate, as elected by the public utility;
  (2) offer a customer the option to purchase electricity:
    (i) from the utility's current mix of energy supply sources; or
    (ii) entirely from renewable energy sources, subject to the conditions established under section 216B.169, subdivision 2, paragraph (b), and subdivision 3, paragraph (a); and
  (3) be made available to the residential customer class.
(b) The public utility may, at its discretion, offer the tariff to other customer classes.
(c) The commission shall, after notice and opportunity for public comment, approve, modify, or reject the tariff. The commission may approve the tariff if the public utility has demonstrated that the tariff:
  (1) appropriately reflects off-peak versus peak cost differences in the rate charged;
  (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;
  (3) provides for clear and transparent customer billing statements including, but not limited to, the amount of energy consumed under the tariff; and
  (4) incorporates the cost of metering or submetering within the rate charged to the customer.
(d) Within 60 days of commission approval of a public utility's tariff filed under this section, the public utility shall make the tariff available to customers.
(e) The utility may at any time propose revisions to a tariff filed under this subdivision based on changing costs or conditions.

Subd. 3.Data reporting.

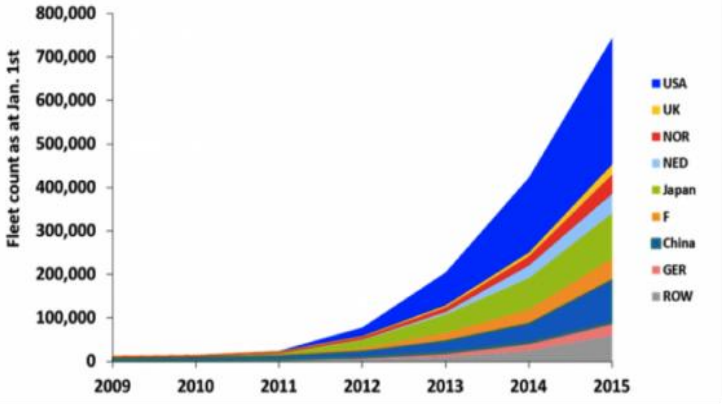
Each public utility providing a tariff under this section shall periodically report to the commission, as established by the commission and on a form prescribed by the commission, the following information, organized on a per-quarter basis:
(1) the number of customers who have arranged to purchase electricity under the tariff;
(2) the total amount of electricity sold under the tariff; and
(3) other data required by the commission.

History: 2014 c 254 s 10

Appendix B: Electric Vehicle Overview

At this time, an electric vehicle[34] (EV) tariff may seem unnecessary. After all, only about 68,000 EVs were sold in the U.S. last year, which was less than 1% of total vehicle sales.[35] But while the total sales are low, as the chart[36] below shows, they have been increasing exponentially both nationally and worldwide. Technology advances are driving down costs while increasing battery range. EVs offer a number of advantages over internal combustion engines, and if battery technology continues to advance at its current rate, EVs could become cost-competitive with internal-combustion cars in just a few years.

Though EVs are primarily a niche product in Minnesota today, their costs are falling rapidly. Technological advances have reduced battery costs—which are typically the highest-cost component of an EV—by 50 percent over the last four years.[37] In addition, Tesla Motors recently began construction of a $5 billion battery factory, which the company believes will reduce battery costs by at least 30% solely through economies of scale.[38]



This dramatic decline in battery prices will allow for both price decreases and driving range increases. The current most popular EV, the Nissan Leaf, retails for $30-35,000 and has a range of only 84 miles. At least two automakers—Chevrolet and Tesla—plan to offer comparably priced EVs with a range of at least 200 miles within the next two years.[39] And Volkswagen's head of powertrain development recently said he believes the company will be offering EVs with a 310-370 mile range as early as 2020.[40] In addition to these companies, Audi, BMW, Ford, Mercedes, and Nissan each plan to increase their EV offerings in the next few years.[41]

But, will there be demand for these new EVs? Staff suggests there are several reasons to believe that there will be. First, EVs can have tremendous environmental benefits. EVs are much more mechanically efficient than internal combustion engines: according to the U.S. Department of Energy, "Electric vehicles convert about 59%–62% of the electrical energy from the grid to power at the wheels—conventional gasoline vehicles only convert about 17%–21% of the energy stored in gasoline to power at the wheels."[42] And, while several recent studies have found that

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[34] While hybrid electric and plug-in hybrid electric vehicles are sometimes referred to as "electric vehicles," here Staff uses the term to mean fully electric vehicles (with no internal combustion engine).
[35] Lienert, Paul, "Automakers race to double the driving range of affordable electric cars," *Reuters*, Mar 24, 2015. (link)
[36] Source: Figure 1: Global EV Sales Through 2014, from Hunt, Tam "The Future of the Electric Car," *GreenTech Media*, April 1, 2015 (link). These figures include both EVs and plug-in hybrids.
[37] U.S. Department of Energy, "The History of the Electric Car," September 15, 2014. (link)
[38] Wald, Matthew, "Nevada a Winner in Tesla's Battery Contest," *New York Times*, September 4, 2014. (link)
[39] Lienert, Paul, "Automakers race to double the driving range of affordable electric cars," *Reuters*, Mar 24, 2015. (link)
[40] Motoring.com.au, "Volkswagen expects 500km battery range by 2020," October 6, 2014 (link).
[41] See, e.g.: Ibid; Autonews.com, "Mercedes to add 10 new plug-ins by 2017," March 21, 2015 (link); Taylor, Michael, "2016 BMW 328e Plug-In Hybrid," *Car and Driver*, January 2015 (link).
[42] U.S. Department of Energy, "All-Electric Vehicles." (link)

an EV powered entirely by coal facilities produces the same (or greater) amount of greenhouse gas (GHG) emissions as an internal combustion engine, EVs powered by a more diverse generation fleet can have considerably lower emissions; for example, according to a Union of Concerned Scientists Report, an EV powered by Xcel Energy's current resource mix would have the GHG emissions of an internal combustion engine-powered car getting *over 1,500 miles per gallon*.[43] This will be a major selling point for environmentally minded consumers, especially considering the transportation sector contributes nearly as much of the country's GHG pollution (27%) as the electricity sector (31%).[44]

But while EVs' environmental benefits will appeal to some consumers, Staff believes it is EVs' convenience that will help them achieve broader appeal. Extended driving ranges mean EV owners will be able to virtually eliminate trips to the gas station: as over 99 percent of trips in the U.S. are less than 100 miles, an overnight charge in the garage will provide more than enough power for practically all outings.[45] EVs also cost much less to fuel: if an EV battery is charged on an off-peak rate of 4¢/kWh, the electricity required to drive an EV the same distance as a gallon of gas (the "eGallon" price) would cost only about 40¢.[46] EVs also require less regular maintenance, as they do not require oil or coolant changes and they have fewer moving parts that can wear out and break. In Staff's view, this is the aspect that has the potential to move EVs from a niche product to the mainstream: if sticker prices keep falling and driving ranges move over 200 miles, Staff believes many people who couldn't care less about the environmental benefits will buy EVs simply for the convenience and economics.

One factor that may delay EV adoption in Minnesota is the impact of extreme weather on driving range. A recent MIT Technology Review article summarized the issue: "Cold weather presents two main challenges for electric vehicles: cold air limits battery performance, and running the heater drains the battery. As temperatures go below freezing, some drivers accustomed to traveling 250 miles on a single charge have seen their car's range drop to 180 miles."[47] But, while some loss of range is inevitable in extreme weather, there are measures that can be taken to mitigate this loss. For example, Tesla EVs use waste heat generated by the motor to heat the battery and reduce loss. Advances in battery technology will also improve winter performance.[48] Moreover, Staff notes the impact of battery due to extreme weather will be allayed by newer EVs' increased driving ranges; a 30% drop in driving range will induce much less "range anxiety" for an EV with a 300 mile range than one with a 40 mile range.

EVs' Impact on Utilities

Expanded EV penetration provides an extraordinary opportunity for electric utilities. Navigant Research estimates that adding an EV will increase Residential customer load by 33% to 37%.[49]

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[43] Calculated by Staff using the 2012 Union of Concerned Scientists report "State of Charge" (page 5, Table 1.1) and Xcel Energy's 2015 Integrated Resource Plan (Docket No. 15-21) "Figure 10: Energy Mix, Preferred Plan," from page 69 of the Preferred Plan section of the Company's January 2, 2015 filing.

[44] U.S. Environmental Protection Agency, "Sources of Greenhouse Gas Emissions." (link)

[45] U.S. Department of Transportation, "Our Nation's Highways: 2008, Figure 4-5. Percent of Trips and Vehicle Miles by Trip Length." (link)

[46] Calculated by Staff using the U.S. Department of Energy's "eGallon" methodology (link).

[47] Bullis, Kevin, "Electric Vehicles Out in the Cold," *MIT Technology Review*, December 13, 2013. (link)

[48] Ibid.

[49] Navigant Research, "Electric Vehicle Geographic Forecasts," 2014 (link).

The Edison Electric Institute called electrification of transportation the electric industry's "biggest opportunity."[50] As EEI concluded in a recent report:

> Stagnant growth, rising costs, and a need for even greater infrastructure investment represent major challenges to the utility industry. To maintain our critical energy infrastructure while investing for the future, today's electric utilities need a new source of load growth—one that fits within the political, economic and social environment.
>
> Electrification of the transportation sector is a potential "quadruple win" for electric utilities and society, and will enable companies to support environmental goals, build customer satisfaction, reduce operating costs and assure the future value of existing assets.[51]

These EV charging tariffs are essential for utilities to realize the full benefits of electrification of the transportation sector. If the EV tariffs are well designed and marketed, EV charging during off-peak hours will enhance utilities' operational efficiency (through increased load factors) and will reduce EV owners' bills by taking advantage of lower nighttime electricity prices.[52]

If EV owners have no incentive to charge their cars during off-peak hours, it's likely that most will begin charging when they arrive home, which could exacerbate the "peakiness" of residential demand. A Level 2 EV charger uses a typical household service of 240 volts—similar to an electric dryer—and often requires upgrading or adding wiring and other electric equipment wherever the vehicle will be charged.[53] These chargers use 3-6 kW on average, which is comparable to a residential central air conditioning unit or electric water heater. Some larger fast chargers, however, can have a power demand of up to 19 kW.[54] Because distribution transformers generally serve between 5-15 homes, depending on the existing transformer load, incremental load from multiple EVs could cause the transformer to overload.[55] Thus, it is important to track EV penetration in a utility's service territory to account for distribution-level impacts and effectively employ rate design to encourage efficient load management.

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[50] Edison Electric Institute, "Transportation Electrification: Utility Fleets Leading the Charge," June 2014, at page 1. (link)

[51] Ibid, at page 3.

[52] To aid the integration of EVs, the Electric Power Research Institute has been working with automakers and utilities to develop standardized charging technologies, which would make it both easier and less expensive for utilities to integrate the EV chargers on their system into a single grid command system. As EV adoption increases, this technology will make it possible for utilities to further optimize the benefits of off-peak EV charging.

[53] The EV rate proposals do not clearly distinguish between Level 1 and 2 charging. Attachment C of MP's proposal states the Company's "Type of Service" is "Single phase, 60 hertz, voltages of 120 to 240 volts, supplied through one meter at one point of delivery," although MP proposes only one service charge ($4.25). Xcel's language is similar, only its proposed service charge is slightly higher ($4.95). Otter Tail proposes to offer its EV Rider to all customer classes, and OTP includes three different types of metering.

[54] U.S. Department of Energy, "Evaluating Electric Vehicle Charging Impacts and Customer Charging Behaviors—Experiences from Six Smart Grid Investment Grant Projects," December 2014, at page iv. (link)

[55] A future conversation could be cost allocation with respect to the incremental device that triggers an equipment upgrade. This issue exists already with air conditioning. If EV ownership is "clustered" in certain areas, utilities could need to upgrade distribution equipment. Given the presently low market penetration of electric vehicles, however, clustering and transformer overload are not likely to be pressing issues in the immediate term.