BEFORE THE PUBLIC UTILITY COMMISSION OF OREGON

UM 1461

In the Matter of Electric Vehicle Charging Infrastructure and Rates	STAFF's CLOSING COMMENTS

INTRODUCTION and PROCEDURE HISTORY

Procedure History

The Commission opened docket UM 1461, Investigation into Electric Vehicle (EV) Charging Rates and Infrastructure, on December 8, 2009.

On June 16, 2010 staff circulated a draft issues list to the parties in this investigation. On June 22, 2010 staff held a public workshop to frame the issues and gather concerns from the parties. On July 22, 2010, Staff issued a straw proposal which provided a framework for opening comments from all parties.

On August 6, 2010 staff held a second workshop. On August 27, 2010, all parties submitted Opening Comments. The Commission held a technical briefing on September 10, 2010. Based on issues raised at the briefing, the Commission issued a Bench Request on November 15, 2010, directing parties to respond to specific issues and questions.

The parties responded to the Bench Request on February 10, 2011. Staff held an additional workshop on March 2, 2011. Staff now issues these Final Comments.

In these comments, staff first proposes goals that provide a framework for the policies that follow. Staff next proposes criteria for utility investment in public charging. Staff next proposes rate structures for EV charging, as modified from earlier comments, and addresses concerns raised by other parties. Staff next considers actions to allow utilities to actively control the grid impacts of electric vehicle charging during peak load periods. Finally, staff proposes future planning and reporting requirements. Staff proposes guidelines at Attachment A of these comments and EV rate design principles in Attachment B.

In these comments and attachments:

"Electric Vehicle Service Equipment" (EVSE) is the equipment that provides for the transfer of power supplied by the public utility to the electric vehicle. The EVSE can be

located at a home for sole use by the owner, a multifamily dwelling for use by occupants, a place of work for use by employees, a commercial establishment for use by customers, or a public place for use by the general public.

An "EVSE Service Provider" is the entity that owns, maintains and operates an EVSE for use by the general public, for a fee or provided free of charge and on a stand-alone basis or in combination with other services. The EVSE Service provider could be a public utility, a business that offers EV charging in addition to other goods or services offered at the premise, or a third party for whom EV charging is the primary business.

"Public Utility" has the meaning given that term at ORS 757.005.

I. GOALS

A. Context

In scoping the issues for this investigation, staff considered the status of EV adoption now and the projections for EV adoption in the future. Key references included the Governor's Alternative Fueled Vehicle Infrastructure Working Group (AFWG) [1], and the Electrification Coalition (EC) "Electrification Roadmap." These reports set goals of EVs comprising up to 1% of cars registered in Oregon by 2015 at the earliest. Portland General Electric's (PGE) Integrated Resource Plan (IRP) states that it could serve EVs at up to 5% of registered cars without new capacity investments. The Electrification Coalition set a goal of EVs as 5% of registered cars by 2020.[2] These are goals, not projections, and are provided for context only.

As the Oregon Department of Energy (ODOE) explained in its February 2011 comments, EV adoption depends largely on factors outside the Commission's control such as financial incentives, advances in technology and availability of public charging. Within this context, staff first considered whether the Commission's overall mission is:

- to remove barriers and promote EV adoption in the short term, or
- to prepare now for whatever EV adoption rate occurs years from now.

Staff believes its proposals accomplish both. Staff proposed goals and policies that pave the way for future integration of EVs into the grid while supporting early adopters now. In fact, staff believes its proposed polices help to address concerns over the development of public EV charging infrastructure and reward well-informed early adopters. Further, staff believes its proposed policies meet the Commission's core role of assuring reliable electricity supply at fair and reasonable rates that are not unduly discriminatory.

B. Goals for this Investigation

The goals proposed stated in Opening Comments were

[1] The Alternative Fuels Infrastructure Working Group (AFWG) was created by Governor Kulongoski in Executive Order EO-08-24. It issued its Final Report January 2010.

[2] These are ambitious goals. In the 2011 State of the Union address, President Obama set a goal of 1 million EVs by 2015, roughly equivalent to 10,000 EVs in Oregon.

1. Enable the development of both privately owned and publicly available EVSE infrastructure in a way that is flexible and keeps all options open to different EV charging business models as the market matures.

2. Manage the impact of EV charging on utility load profiles and infrastructure by encouraging charging at off-peak periods, and anticipate the potential for EV's to provide ancillary services.

3. Ensure no undue shifting of EV related costs onto non participating ratepayers.

Proposed Goal 1
The AFWG Final Report and the EC Roadmap report both named uncertainty over adequate public charging as a key barrier to adoption. Staff's proposed Goal 1 is intended to address that barrier. The goal of keeping options open is consistent with comments by PGE that advocated flexibility, and with PacifiCorp comments that stressed barrier removal. Staff believes keeping options open to different public charging business models is important to the development of a viable third party market in public charging.

Proposed Goal 2
PGE and PacifiCorp both characterized Goal 2 as premature. PGE stated that "…policies that anticipate EV use and deployment many years into the future could be significantly out of step with the EV marketplace as it develops." PacifiCorp cautioned against "overemphasizing EVs for ancillary services at this time." ODOE, PGE and PacifiCorp stated that the number of EVs is too small in the short run to significantly affect the grid, so that steps to promote off-peak charging are not needed for several years.

But other parties supported proposed Goal 2. Ecotality supported additional consideration for demand response and incentives to reduce energy use at certain times. CUB did not comment on the goals but did express limited support for some policies aimed at shifting charging to off-peak periods. Northwest Energy Coalition (NWEC) and Gridmobility stated the Commission should emphasize the role of EVs in integrating renewables.

Considering this range in positions, Staff believes Goal 2 strikes a reasonable balance.

Proposed Goal 3
No party disagreed with proposed Goal 3.

Discussion
Some parties commented that these steps suggested by Goal 2 are not necessary at this early stage and might discourage early adopters. Staff has modified its proposed guidelines to address these concerns, but still believes that now is the right time to begin implementing forward looking policies as suggested by Goal 2. We explain why and address specific concerns at sections III.D and III.G of these Final Comments.

Staff Recommendation: The goals as stated above remain appropriate.

II. Utility Investment in Publicly Available Charging

In Opening Comments, staff stated that utilities should not include any costs of public charging stations in rates. Staff based this position on Goal 1, keeping options open for public charging station business models. Staff maintains that allowing utilities to include the costs associated with providing public charging service in rates will crowd out third party public charging service providers. This outcome would be contrary to the goal of allowing a competitive market to develop. Without an EV customer class, allowing utilities to include the cost of public charging stations in rates could also lead to non-EV owners paying for EV charging infrastructure.

At its public workshop on September 10, 2010, the Commission heard statements by other parties in support of allowing costs of publicly available EVSE stations to be included in rates under certain circumstances. In its Bench request the Commission asked parties for criteria that it might use to review a utility request to include such costs in rates. In its February 10, 2011 response, staff offered the following criteria:

i. The utility's costs (investment and operating) in charging stations must meet the same net benefit test as other utility investments;
ii. There is no likelihood that third party EVSP's or unregulated affiliates can provide the same services at the same or similar locations;
iii. Charging infrastructure in that location is essential for EV adoption; and
iv. The utility has established an EV rate class. If the Commission wants to allow cost recovery in order to remove a barrier to EV adoption, then those costs must be spread over a separate EV customer class, with no costs assigned to other ratepayers.

These criteria are consistent with the Goals of this investigation. Criterion (i) stems from the goal to prevent undue shifting of EV related costs onto non-participating ratepayers. Some of the revenue needed to recover the investment in EVSEs will come from EV drivers using the service. But if that revenue is not sufficient, then the remainder will come from ratepayers, including ratepayers who do not own EVs. If those ratepayers are asked to provide a return on the investment, then the utility must show how those ratepayers benefit.

Criterion (ii) helps support the development of a third party market in public charging. Allowing utilities to rate base public charging stations could crowd out third party charging providers who must recover their investments from revenue alone.

Criterion (iii) addresses concerns raised at the September 10, 2010 workshop about underserved rural communities. There may be some rural locations that do not fit a business model for third party EVSE providers but where publicly available EV charging is necessary to address EV range limitations. In these locations, the Commission could consider allowing utility investments in publicly available EVSEs in the public interest, but only if the investment is essential for EV adoption in general.

Criterion (iv) is necessary to ensure no undue cost shifting. If costs related to public EV charging are assigned to ratepayers, there must be an EV class to assign those costs to. Otherwise non-participating ratepayers would bear the costs of public EV charging.

Staff has modified the language of its proposed criteria for clarity, and recommends those criteria as guidelines in Attachment A to these comments.

Points raised by other parties:

"Only affiliate ownership should be allowed (CUB)"
This is consistent with staff's opening comments. CUB is concerned about cost shifting, and Staff concurs. However, at the September 2010 workshop, some parties argued that there might be special cases where utility-provided public charging was essential for EV adoption and should not be categorically excluded. The Commission requested some review criteria in its November 15, 2010 Bench Request. Staff believes its criteria are responsive to the Bench Request and allow the Commission to consider the public interest while setting the bar high enough to prevent non-EV owners from bearing undue costs related to EV adoption. EV owners are protected by proposed criterion (i).

The EV customer class should bear the associated costs (CUB)
Staff agrees. That is why the establishment of an EV customer class is one of staff's proposed criteria. The utility should only include costs associated with providing public EV charging in rates if the benefits to customers outweigh the costs. The day may come when EVs can provide a general grid benefit. But for the present, the people benefiting from publicly available charging stations are EV customers.

The criterion should be "prudence" (Idaho Power, PacifiCorp, PGE)
The term "prudence" is too narrow. A determination of prudence generally rests on whether there were cheaper alternatives that the utility could have pursued. Relying solely on prudence would not allow consideration of whether a private business could provide the service or whether publicly available EVSE is even essential in that location. This sets the bar too low for inclusion in rates. Utilities argued that there are special circumstances where public charging costs should be allowed in rates. Staff believes the Commission, in its Bench Request, was asking for more detail on those special circumstances. In this context, prudence is necessary but not sufficient.

Utilities as Provider of Last Resort (PGE)
There may be locations where no third party EVSP chooses to offer public charging service. PGE stated that in those locations the utility might be the provider of last resort. But the term "provider of last resort" implies an obligation to serve. That obligation applies to the electricity delivered to the EVSP, not to the EVSP itself. The utility is the provider of last resort for electricity delivery within its service territory but it is not the provider of last resort for equipment on the property that consumes electricity.

The "Coquille" example

At the March 2, 2011 workshop, PacifiCorp gave the example of a rural city like Coquille requesting a utility owned public EVSE in their community to promote EV adoption. In this case, the city should be the customer. Staff supports efforts by rural communities to promote EV adoption, but does not believe the costs should be placed in rates unless the criteria above are met. If a city wants public charging stations to promote EV adoption, it has the option to contract with an independent EVSP. The utility should not have an advantage over independent EVSPs by including costs in rates.

Service in Public Right of Way (PGE, ODOE)
PGE stated that some local governments may only accept publicly available EVSE in the public right of way if it is owned and operated by the utility. ODOE, at the March 2, 2011 workshop, stated that some local governments are reluctant to contract with a third party EVSP because they are concerned that the EVSP will abandon the charging station for business reasons. Staff's proposed criterion (ii) allows consideration of these concerns.

Rate based EVSEs in the public interest (ODOE)
Staff recognizes that EV adoption is a state and national goal, and agrees that development of adequate public charging infrastructure is essential to EV adoption. This is why staff modified its original position to leave the door open for including EVSE costs in rates under special circumstances.

III. Rate Structures and Cost Recovery

In Opening Comments on August 2010, staff proposed that utilities submit a single mandatory EV rate schedule that would apply to all charging: residential, fleet, and publicly available charging.

Staff has modified its proposal to address the questions in the Commissioners' Bench request and the concerns raised by other parties. In these Final Comments, Staff explains its modified proposal and addresses other parties' concerns.

A. Staff's Modified Proposal for Rate Structures

Staff heard the concerns raised by others regarding mandatory rates, and modified its proposal. Staff now recommends that residential and small commercial customers have the choice of:

- a separate EV rate, keeping the remainder of the premise on current rates, or
- placing all electric use on the existing whole-premise time-of-use (TOU) rate.

Staff continues to support a mandatory EV rate schedule with a TOU structure for large customers. [3]

[3] PacifiCorp raised the possibility that mandatory EV rates for large customers may conflict "with current laws and rules concerning portfolio options, direct access and customer choice." *See* Pacific Power Response Comments at 6 (February, 2011). Staff does not fully understand PacifiCorp's position. Taken to its logical conclusion, PacifiCorp's concern would suggest the Commission lacks jurisdiction over the setting of rates for those customers who qualify for a direct access option set forth in ORS 757.600 to 757.689. This would be an absurd result. A utility may offer a mandatory EV rate schedule with a TOU

From the utilities' point of view, the cost of service is the same whether the EV is part of a fleet, an employee's private vehicle or owned by the general the public. Therefore, staff recommends that only one EV rate schedule be developed. The rates in that schedule will be the same for private and publicly available charging.

Staff concurs with comments by Idaho Power and PGE regarding difference in cost of service based on factors such as voltage. Cost differences based on voltage and other service costs should be included in the EV rate schedule.

Staff's responds to concerns raised by others at sections III.C, III.D and III.G below.

B. Cost assignment of local distribution upgrades

Staff recommends treating increased loads for purposes of meeting EV charging loads in the same way as any other increase in load that leads to local distribution upgrades.

As explained in opening comments, all three of Oregon's investor owned electric utilities have existing line extension policies. A customer needing a line extension is given an allowance. Costs within that allowance are covered by the utility and treated as an operation expense. Costs over that allowance are charged directly to the customer. Large nonresidential customers generally work directly with the utility as it assigns the cost of local distribution upgrades on a case by case basis.

In its Bench Request the Commission asked about assigning costs of local distribution upgrades. All parties agreed that it is not practical or fair to assign those costs to the "last to the system" EV adopter. The parties agreed that any need to upgrade local distribution is the cumulative effect of many new loads, of which the EV adopter is just one. This is one area of inquiry where there was no disagreement.

C. Discussion by Customer Class

1. Residential Customers

As noted above, staff has modified its position and now recommends offering residential customers a choice of rate schedules.

Staff does not recommend charging EVs on existing "flat" rate schedules. This highly flexible use is exceptionally suited for marginal cost pricing. Detailed reasons are in Staff's Response Comments at page 5 and page 18. However, staff acknowledges the concerns raised by other parties, and addresses some of those objections below:

Why not simply rely on existing TOU options?

ODOE, Idaho Power and CUB preferred whole house TOU rates to an EV specific rate. Current TOU rates do not fully reflect the very low costs to serve the light load hours between 10 pm and 6 am and on Sunday. Existing residential and small commercial TOU

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structure for large customers without interfering with a large customer's ability to exercise its direct access options. Further, staff's proposal gives residential and small commercial customers a choice of rates.

rates assign transmission and distribution costs equally across all time periods. Off-peak and shoulder rates with no embedded transmission and distribution costs would better reflect the real cost of service and give greater incentive to charge off-peak.

Staff has consistently supported marginal cost pricing in general. That is why staff now supports the option of EV charging on the existing whole house TOU rate. But to date only about 1% to 2% of customers have opted in. More outreach effort might increase this percentage among EV adopters, but by how much? Offering an EV rate without changing the price of other house loads gives customers another option.

Why the small initial EV population is not reason to delay
Some parties commented that steps to move EV charging to off-peak hours are not needed yet because the EV population is too small to affect peak load. ODOE noted that hybrid cars took 10 years to reach 1 percent of the vehicle stock in Oregon.

Staff acknowledges that EV market growth may be slow. But state-wide market percentage is not the best metric for local distribution impacts. Of more concern is the adoption rate in neighborhoods along specific feeder lines. Ecotality's market research suggests that early adopters may cluster in certain zip codes.[4] A cluster of EVs charging on peak in one neighborhood could create the need for a local transformer upgrade before the statewide EV population is large enough to affect overall peak load.

Now may be the ideal time to introduce time variant rates. PGE stated *"… we know very little about actual patterns of charging that customers will prefer. Customers may or may not opt to use the vehicle's charging timer… to charge off peak…*[5]*"* This is precisely why measures to shift charging to off-peak hours are appropriate now. Habits established now will set the pattern for later, more "mainstream" adopters. Sending a signal now to charge off-peak is important if this message is to be heard in the future. Also, developing metering and billing procedures for a separate rate now gives all parties the time to learn while the EV numbers are small.

By introducing TOU rates now, the Commission will communicate to current and future EV adopters that the cost of EV charging will reflect the actual cost to the utility.

Lack of data is not a reason stay with the status quo
PGE and PacifiCorp state that there is not enough load data to properly design EV rates. But marginal cost to serve EV load at different times could be inferred from existing load and cost data. As noted at the beginning of these Final Comments, most studies do not project the EV market to be large enough to significantly change marginal costs for several years. Currently available data on marginal costs is sufficient to develop an EV rate schedule at this time. Staff offers general rate design guidelines at Attachment B.

[4] Ecotality's "Long Range Transportation Electrification Plan" has detailed maps showing specific zip codes where they expect the highest near term adoption rate.
[5] PGE response comments at p.12

Uncertainty over EV charging preference is actually a good reason for introductory rates now. This is an iterative process. EV rate schedules adopted over the next few years will evolve as we learn more. We will only learn more as we implement EV rate schedules. It is therefore best to start reasonably soon. Staff proposes that we start simple with TOU rates that have three fixed time periods for two seasons.

Finally, staff is concerned that if we wait to introduce time- variant rates for EV charging until there is enough data, the time may never arrive. The data from the Ecotality Project will provide insight about early adopters but not from more mainstream EV owners. And, if we wait until the EV market is mature before introducing time variant rates, some stakeholders will claim it is too late because they have become accustomed to the standard "flat" rate. The calls to wait for "more data" will never stop altogether.

Separate EV rates now will produce the data for future rates
PGE and PacifiCorp both state that more data is needed. PacifiCorp stated:

> "…To ensure that reliable cost of service data is available to properly allocate and develop electric rates applicable to EV charging, it is critical in the early stages of the deployment of this new technology to identify and capture reasonable opportunities for information collection regarding the amount and time of electric usage by this technology… The Company will also be considering policies that encourage EV owners and public charging station operators to install metering capable of registering the time and amount of EV charging separately from other electric usage…" [6]

CUB and ODOE both supported data collection requirements. CUB called it imperative for utilities to gather data on system impacts and energy use pattern. ODOE proposed that the Commission examine ways to collect data from existing pilot EVSE deployment, noting that *"…a utility providing the load profile that depicts load impacts associated with EV usage across different time periods would be worthy to examine."*[7]

Staff supports the idea of collecting this information, and reiterates that without separate metering, the data suggested by CUB and ODOE is difficult to collect. The charging devices may have data collection capability, but the Commission has no claim to those data unless they are part of the utility's billing process.

Voluntary sampling as suggested by PacifiCorp will produce some data. But with standard rates, the data provide no insight into customers' response to a rate signal. Those who opt-in to whole house TOU rates would likely charge at night anyway. A new EV rate schedule with a TOU structure will provide better information for future rate design.

Objections to specific end-use rates
Several parties argued against end use rates in general. But end use rates already exist for irrigation and street lighting. End use rates for EVs do not break new ground.

[6] PacifiCorp Opening Comments at p.2 and 3
[7] ODOE response comments

More importantly, EVs are not like other house loads of similar magnitude. Having a battery is a game changer since the user can shift their time of charging with no cost or inconvenience. The cars and EVSEs now come with programming capability, if the owner elects to use it. This gives EV charging temporal price elasticity much greater than any other end use. As the difference between the price and the incremental cost of service increases, the amount other sales must recoup also increases. To avoid this type of embedded cross-subsidization, we have proposed that (a) off-peak energy rates be set at marginal cost using some proxy for light-load hour energy, and (b) on-peak energy charges at least cover the Long Range Incremental Cost (LRIC).

As noted above, staff has advocated marginal cost principles in past proceedings. But for EV charging, marginal cost principles should get more weight than in the past. EV charging may be the one end use where customers benefit from a TOU rate even if they are reluctant to adopt TOU rates for other end uses.

The potential for "gaming" is not a compelling reason to stay on standard rates
CUB commented that EV owners on a separate EV rate might game the system by putting their EVs and other loads on whatever outlet has the lower rate at the time. Staff partially addresses this concern by applying its proposed rate guidelines only to EV charging at 220 volts or greater. This removes the incentive to rate shop for loads of 110 volts.

Gaming is a form of theft and is always possible. Telephone companies, cable companies and internet service providers face similar concerns already. Indeed, utilities have customers trying to bypass the electric meter altogether. But the Commission has not let that problem drive its entire rate policy. Staff acknowledges that some rate gaming is possible but does not recommend that it unduly drive policy. And how many homeowners will take the trouble to dry their clothes from the EVSE outlet at midnight to save a few cents on laundry? Any customer willing to do so could just as easily reduce their entire bill with the whole house TOU option.

2. Small Commercial Customers

Staff proposes that EVSEs owned by small commercial customers (<30 kW) have the same choice as residential customers. They could either pay a separate, time variant EV rate or place their entire premise on the utility's current TOU option. This policy would apply to EVSEs used for fleet vehicles, employee-owned vehicles or available as a charging service to the general public.

Having this choice is even more appropriate for small commercial customers than it is for residential customers. Staff's Response Comments described the emergence of fleet vehicles as target market for EVs. And, Ecotality has identified small commercial customers as good host locations for public charging stations under their pilot program.

Small commercial customers might prefer a separate EV rate over a whole premise TOU rate. They may see the cost of a separate meter or submeter as a business investment with

an acceptable payback period. Small businesses might have less ability to shift their business's electric use, making them less interested in a whole premise TOU rate. Staff explained the advantages of a separate EV rate for small commercial customers in more detail in its February, 2011 Response Comments at p. 16.

A separate EV rate is not a barrier to business owned EVs
In its Response Comments ODOE argued that businesses considering an EV fleet could find separate metering to be an administrative burden. Staff disagrees. Only one submeter would be needed for all the EVSEs at a site. The cost of a meter base and meter would be spread over all the EVSEs at the site. For this one-time cost, the business gets a consolidated monthly bill for all EVSE use[8], and benefits from low rates at night. The higher rates during the day would assure that EV owners see the actual cost of peak period charging and incent the business to charge its own fleet vehicles at night. If employees or users of public charging stations see a higher daytime price, that is fair because it reflects the actual cost of daytime charging.

A separate EV rate removes a potential barrier to third party public charging
In its response comments, Ecotality discussed demand charges that public EVSE stations could incur in some instances. Ecotality stated that demand charges might not greatly affect the business case for a public EVSE hosted by a large commercial or industrial customer, but could discourage a small business from hosting an EVSE for public use.

Ecotality wrote a more detailed analysis in its Response Comments and its testimony before Washington's Utility and Transportation Commission (WUTC). Based on those comments, it appears that demand charges may not be a barrier to level 2 (220 V) public charging but could add to the cost of operating a level 3 (480 V) "quick-charging" station. A separately metered EV rate could address this concern if properly designed.

3. Large Commercial Customers

For large commercial customers staff supports a mandatory EV rate with a three time-period structure that reflects time variations in marginal cost of power delivered to EVSE.

Unlike residential and small nonresidential customers, staff recommends that the separate EV rate apply to all large customers. Existing TOU rates for large customers should not apply to EV charging. While those energy rates are time-differentiated, the high price period encompasses both on-peak and shoulder periods. Also, the current ratio of high-price to low-price rates is much lower than the ratio of actual energy costs based on wholesale power markets. The issue of rate design of the existing TOU rate schedule is beyond the scope of this docket

As discussed on p. 28 of Staff's Response Comments, businesses need regulatory certainty about the costs of EV charging in order to make business decisions. For example, because large batteries are costly, some businesses could choose to purchase

[8] Separate metering would also enable the EV owners to apply for Low Carbon Fuel Standard (LCFS) credits, in the event that the Department of Environmental Quality implements that program. *see* DEQ's Response Comments. February 2011.

EVs with smaller batteries that will need recharging during the day.[9] This might be the cheapest option for the fleet owner, but it results in EV charging at high cost periods.

Businesses with diurnal charging patterns that impose high costs should not expect to avoid those costs by staying on standard rates. If the Commission plans public EV charging customers and fleet EV owners to face actual differences in cost of service at different times of day, now is the time to begin implementing that policy so that businesses can plan accordingly.

D. Why this Staff proposal is consistent with the Goals.

At the start of these comments, we asserted that the Commission could adopt policies that fulfill the Commission's traditional regulatory role and at the same time help meet state goals for EV adoption. The policies above accomplish that because:

1. They support the development of public charging infrastructure

The AFWG final report and the December 2009 staff memo that opened this investigation both cited development of public charging as a key to EV adoption. The recommendations in these Final Comments support development by leveling the playing field for third party providers. Staff's criteria for cost recovery of utility owned publicly available EVSE at section II of these comments were meant to support this goal.[10]

A uniform EV rate for all public charging will assure that the business case for third party providers is not distorted by different electric rate structures. Charging station sites will be selected based on location, vehicle traffic, and convenience to drivers. The Commission cannot assure uniform prices in different service territories and has no influence over independent EVSPs' pricing models. But having all public EVSE within a service territory on the same underlying rate structure is one way the Commission can help provide the "seamless public charging environment" that PGE advocated in its opening comments.

Ecotality, the major independent EVSP participating actively in this docket, has supported separate metering. In its response comments Ecotality stated: *"…There is no way to minimize the costs and maximize the benefits of PEV tailored rate design without customer usage information. The most practical and cost-effective approach to obtaining customer usage information is by mandating submetering… PEV load should be measured and billed directly to enable rate design options and to properly allocate costs and benefits. The Commission should require implementation of submetering arrangements and billing capabilities (i.e. subtractive billing) as soon as possible."*[11]

2. They plan for successful EV adoption in the future, should that happen

[9] The Electrification Coalition cited the ability to customize battery size as an advantage to fleet EVs in its "Fleet Electrification Roadmap" November 2010

[10] At the same time, staff modified its original position to allow for the exceptional case where utility-owned public charging is essential for the development of adequate charging infrastructure.

[11] Ecotality Response Comments, page 20.

Staff does not dispute the projections of slow EV growth by ODOE and others. The day when EV charging measurably affects grid operations may be well into the future. However, the benefits of shifting load to off-peak periods and the potential benefits for integrating renewable generation are well documented. We are more likely to realize those benefits by laying the groundwork now.

Several parties have described EVs as the first smart grid application. Taking advantage of the potential of EVs as a smart grid application will require some investment in metering infrastructure. If that infrastructure is not developed early, while the EV population is small, then it will only be more difficult later. While this Commission cannot bind future Commissions, it can help future Commissions by providing early metering infrastructure and the data gathering. If EV adoption is successful, future Commissions will benefit from early steps taken now.

3. They avoid undue cost shifting

Several questions in the Bench Request relate to cost shifting. Staff believes the best way to avoid cost shifting is to move towards marginal cost pricing.

4. They leverage existing investments in Advanced Metering

Utilities have already made large investment in advanced metering (AMI), but so far only a small percentage of ratepayers are now using the capabilities of AMI. Early experience with EV rates will inform future Commissions and educate ratepayers not just about EV charging but also about the application of smart metering in general.

5. They meet the goal to be flexible and not foreclose options

Proposed Goal 1 of this investigation includes remaining flexible and keeping options open. Staff proposed that goal in the context of the independent public charging market, but the principle is the same for public and private charging alike. Staff does not know if a separate EV rate will be best in the future. It is possible that customers' reaction will be negative. It is also possible that time variant rates will be accepted more generally as smart grid is deployed. But if a separate EV rate turns to be useful in the future, a delay will only make it harder to implement. Early adopters will face the same implementation costs and will be faced with retrofitting their original installation. For public charging and early adopters in the business sector, retrofitting could cost more than installing the separate meters at the outset. Working toward an EV rate now is the best way to keep that option available later.

E. Assignment of EV rate implementation costs

In its bench request, the Commission asked about proper assignment of implementation costs for any separate EV rate. Staff is sensitive to cost shifting concerns and also to the concerns that initial implementation costs might be too large to spread over a small number of early adopters.

Staff proposed a $3 per month metering charge in Attachment A to opening comments[12]. Staff recently reviewed Virginia Power and Electric Company's application to the

[12] The $3 was based on data from PacifiCorp Marginal Cost Study from UE-217

Virginia State Corporation Commission for an EV pilot program in that state. The pilot will involve 750 residential EV owners who will pay a pilot EV rate with separate metering. Another 750 EV owners will pay a TOU rate for their entire house. For comparison, the Ecotality project in Oregon is open to 900 participants. The Virginia pilot includes a $2.90 per month metering charge.[13]

Virginia Power, in its testimony to the Virginia Commission, estimates $750,000 in pilot implementation costs.[14] That includes the costs of data collection and billing. Virginia Power proposes to defer that expense and recover it in the future. This is consistent with Oregon staff's proposal that "back office" costs associated with initial implementation of an EV rate be assigned to all ratepayers. Staff explained in Response Comments that it believes all ratepayers benefit from the existence of a separate time-variant EV rate. Staff does not know if back office costs to implement a separate EV rate in Oregon would be the same as was estimated in Virginia. However, the number of participants in Virginia is comparable to the number of Ecotality pilot participants in Oregon. Staff mentions the costs shown in Virginia's testimony only to give some idea of their order of magnitude.

A modest monthly billing and metering charge will avoid cost shifting, and assigning the back office costs of an introductory EV rate to all rate payers is fair and will avoid discouraging early adopters.

F. Legal Issues Regarding Third Party Public Charging Service by EVSPs

1. Recommended Finding on Status of EVSP

In Opening Comments, all parties agreed that EVSPs are not utilities and are not subject to Commission regulation. Staff recommends the Commission find:

> "The Commission finds that independent companies that provide electric vehicle charging service for public use are not public utilities as defined at ORS 757.005(1) and are not Electricity Service Suppliers (ESS) as defined in ORS 757.600(16) provided that they do not provide any of the ancillary services described in ORS 757.600(2)."

2. Recommendation on Prohibitions in Tariffs regarding Sale for Resale

In Opening Comments, staff described its research into possible legal prohibitions on sale for resale. In consultation with counsel and the utilities, staff concluded that there are no statutory prohibitions, but utility tariffs may need to be amended. For example, Idaho Power stated:[15]

> *"We have not found any rule or statute that prohibits retail customers reselling electricity purchased at retail rates. Idaho Power's tariffs do prohibit such a resale,*

[13] Virginia Power's calculation of the monthly meter charge is available only to parties in that proceeding. Staff's intent is only to show consistency with its own estimate from its August 2010 Opening Comments

[14] Virginia Power's detailed calculation of its $750,000 estimate is not provided in the testimony. Staff cites this figure for information only

[15] Email from Adam Lowney,Idaho Power, to Adam Bless, OPUC, August 19, 2010

however, unless it is pursuant to a grandfathered sub-metering arrangement. This prohibition is found in Rule C, Service and Limitations:

> *6. Limitation of Use. A Customer will not resell electricity received from the Company to any person except where the Customer is owner, lessee, or operator of an apartment house, mobile home court, or other multi-family dwelling where the use has been sub-metered prior to January 1, 1974, and the use is billed to residential tenants at the same rates that the Company would charge for service, unless the Commission authorizes alternative procedures."*

On advice of counsel, staff recommends that utilities be directed to amend tariffs as needed to state that the prohibition on sale for resale does not apply to EV charging services provided by independent EVSPs. This is consistent with the statutory carve out of ORS 757.005(1)(b)(G).

G. Response to concern that EV rates will impede EV adoption

The AFWG Final Report of January 2010 stated that agencies should remove barriers to EV adoption. The AFWG specifically mentioned the PUC. But the AFWG report did not name a specific barrier that is within the Commission's scope. The only regulatory barrier named was EVSE inspection, which was addressed by the Building Codes Agency.

Several parties stated that mandatory rates would impede EV adoption. ODOE stated the EV market is in its infancy and cannot handle any new regulations. Staff heard these concerns and our modified proposal allows more customer choice.

Delays in Meter Installation and Inspection

ODOE, in response comments, stated that a separate meter or submeter would take weeks to install and inspect. But staff has modified its proposal so that residential and small commercial customers can avoid the second meter by choosing an existing whole-house TOU rate. Moreover, an EV adopter could charge their EV on existing rates for the few weeks it would take to have the new meter installed and inspected.

Metering and Billing Costs of a Separate rate

Attachment A to Opening Comments included a $3 per month charge to cover amortization of the meter. EV owners who charge at night will recover this in lower rates. All EV drivers will still pay far less for electricity than they would for gasoline.

EV owners who choose the separate rate would need to buy and install a meter base. This is an up- front cost to the customer. Residential customer may find that the existing whole house TOU rate is the cheaper option. Staff's response comments included a short calculation showing how a "typical" customer who chooses the whole house TOU rate and charges an EV primarily at night can see a lower overall monthly bill than the same customer on standard "flat" rates.[16] Either way, the customer has a choice.

[16] PacifiCorp response comments had a similar statement.

As discussed above, some small commercial customers who buy a fleet of EVs or offer charging service to employees or the public may prefer a separate, time variant EV rate. For these customers, the meter installation could be cheaper over time than a whole-premise TOU rate. Again, the customer has the choice.

The "EVSE as submeter" approach
The best solution long term solution to the metering issues is to use the built in metering abilities of the EV or EVSE[17]. That approach, and the technical issues associated with it, is discussed in detail in Response Comments.

ODOE, in response comments, pointed out that some early models of EVSE lack the metering and communications abilities. Staff responds that this is a typical problem with all new technology. Any earlier adopter who buys the "first to market" product knows that subsequent models will have newer and better features. Docket UM 1460 contained a discussion of this same problem in the much larger context of Smart Grid.

Staff acknowledges ODOE's concern but believes these technical, legal and interoperability issues are best resolved in a focused working group.[18] PGE and CUB expressed support for this approach. Staff proposes the following Commission directive:

> "The Commission recommends that staff propose, at a regularly scheduled Commission public meeting, a follow up proceeding to investigate implications and barriers associated with using the measurement capabilities of EV's or EVSEs to collect billing determinants for billing purposes, in lieu of separate metering or submetering for customers on a separate EV rate schedule."

Is the word "mandatory" a psychological barrier?
ODOE and Ecotality, in response comments, strongly advocated giving customers as much choice as possible. The California Public Utility Commission, in its proposed order on rulemaking R0908009, chose to give customers the choice of a separate EV rate, a whole house TOU rate, or the option of continuing with current standard rates.

Staff recognizes that the mere appearance of limiting choices can discourage some people. There may be little harm in allowing residential EV customers to stay on standard rates in the short run. Many residential customers will charge at night because it is convenient, and others may charge at night with good education efforts.

An Alternate Course of Action that provides greater choice
If the Commission is reluctant to place any limits on the choices available to customers, the "full choice" supported by ODOE for *residential* customers is a reasonable option. But for reasons described above, staff continues to recommend that all nonresidential customers and publicly available charging be on a time variant rate.

[17] The EV may also have metering capability, which would also be appropriate for consideration
[18] As noted in Response Comments, such a working group involving Southern California Edison and EVSE manufacturers is already underway. An Oregon group is useful because of difference in California and Oregon metering rules, but engineering issues could be addressed cooperatively.

The Big Picture – Electric rate policy will not make or break EV adoption
The AFWG final report, the Electrification Coalition's EV Roadmap and ODOE's response comments all listed major factors in the success of EV adoption. The major factor mentioned was the continued federal credit for the purchase of the vehicle. The second major factor mentioned consistently was "range anxiety" and the status of battery technology. The third major factor consistently mentioned was the adequacy of public charging infrastructure.

All of these factors are outside this Commission's control. The federal government has taken the lead in offering incentives for EV purchases and is investing over $200 million in public charging stations. The Commission cannot accelerate progress in technology. Staff and PacifiCorp both observed that the cost to charge a typical EV will be about $20 - $25 per month. From the EV owner's point of view, the price of gas is more of a variable than the electric rate structure. Many EV owners will choose night time charging based on its convenience, and will see lower off-peak rates as a reward, not a barrier.

One characteristic of early adopters is that they have inelastic demand. They pay a premium for being the first to own a new technology, knowing they could pay a lower price if they wait. For example, early hybrid buyers paid well above list price.

In this context, staff disagrees with statements that electric rates will determine the success or failure of EV adoption goals. There are too many other, larger factors.

IV. Utility Reports on Smart Charging and Costs to Implement

In Opening Comments, staff defined "smart charging" as technology enabling utilities to actively control or interrupt the flow of electricity delivered to car chargers in response to grid conditions. Staff did not propose that utilities be required to implement this technology, but did propose a requirement for utilities to report on the status and implementation costs of smart charging technology.

In response comments, staff stated that we are not aware of any other states that are implementing pilot programs on smart charging. That is still the case.

In any case, staff suggested in response comments that smart charging is an example of EVs as a smart grid application, and UM 1460 already proposes a Smart Grid Plan with periodic updates and reporting requirements. If the Commission adopts staff's proposed Smart Grid Plan recommendation, the reporting suggested by CUB and ODOE could be efficiently included in that plan.

V. Should the Commission address an IRP guideline for flexible capacity in this docket?

In its Opening Comments of Aug. 27 Staff proposed a three-part integrated resource planning (IRP) guideline related to flexible capacity (pages 13 and 14). Staff reiterated its support for the three IRP elements its comments of Feb. 10 (pages 24-26).

In their Feb. 10 comments PacifiCorp and Idaho Power opposed addressing any of the three elements in this docket. PGE supported the first two elements and opposed the third element. CUB and ODOE supported all three elements. Ecotality supported the three elements, but tilted toward including the elements in smart grid planning, rather than IRP planning.

Staff continues to support adding a guideline incorporating the three elements to the existing IRP guidelines (Orders No. 07-002, 07-047 and 08-339).

In addition to previous supporting comments Staff notes the following: The current IRP guidelines are silent on this issue of flexible capacity. PacifiCorp and Idaho Power agree that the IRP is the appropriate venue for addressing the issue of flexible resources. Their opposition stems from a desire to address the issue in individual Commission orders acknowledging IRPs.

Staff finds the language of its three elements consistent with the language in the current IRP guidelines. The current IRP guidelines are silent on the issues of the need, supply and evaluation of flexible capacity (see Guidelines 4b, 4f, and 7 of Order No. 07-047, Appendix A).

Staff also notes that all three utilities have conducted or are conducting stand-alone assessments of the costs of providing flexible capacity to integrate intermittent renewable generation as an element in their IRPs. In no case do these assessments examine non-generation alternatives to provide flexible resources.

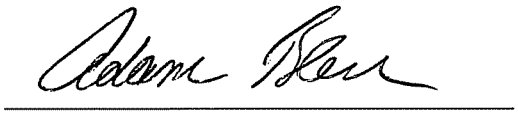
Staff response to statements that IRP guidelines are premature: Several parties commented that IRP guidelines are premature. PGE stated that there is too little available data on EV market penetration and charging habits. ODOE stated that EV adoption will likely not reach 1% of the market until at least 2015. This implies that EVs will not be numerous enough to be a source of flexible capacity for many years. Mitsubishi, in response comments, said that its batteries are not warranted for use as flexible capacity.

Staff addresses some of those concerns in response comments. Staff maintains that all integrated resource planning is based on best information available at the time. A 10 year planning horizon is consistent with current IRP practice and would be consistent with state and federal goals for EV adoption. Not to include any planning for EVs 10 years into the future would be to assume at the outset that those state and federal goals will fail.

In summary: The issue of flexible capacity is not an element of current IRP guidelines. The language of the Staff proposed guideline is consistent with the language and content of existing guidelines. The issue is and will likely continue to be relevant for resource planning for all three electric utilities. Whether to add the guideline has been sufficiently

vetted in this proceeding. Therefore, it is appropriate for the Commission to add Staff's proposed guideline to the existing general IRP guidelines.

Dated at Salem, Oregon this 1st day of April, 2011



Adam Bless
Senior Utility Analyst
Electric Rates and Planning
Public Utility Commission

Attachment A: Proposed Guideline for Electric Vehicle Rates and Infrastructure Development

Attachment B: EV Rate Design Principles

Attachment A - Proposed Guideline for EV Rates and Infrastructure Development

I. Utility Investment and Operation of Publicly Available Charging Stations

Utilities may own and operate publicly available EV charging stations. Unless specifically approved by the Commission, the investment costs and operation and maintenance costs associated with utility-owned publicly available charging station shall not be recovered in rates. Power supply and connection charges to any utility-owned publicly-available charging station shall be charged at the same PUC approved rate as would apply if the publicly available charging station were independently owned.

The utility may request recovery of investment costs and operation and maintenance expenses associated with ownership and operation of publicly-available EV charging station in rates. Any request to the Commission for cost recovery in rates should demonstrate that the proposed investment costs and expenses of such service would meet, at a minimum, the following criteria:

i. The utility's investment costs and operating expenses in charging stations must meet the same net benefit test as other utility investments.
ii. Publicly available charging at the same or similar location is highly unlikely to be provided without utility investment and cost recovery in rates.
iii. Charging infrastructure in that location is essential for widespread EV adoption
iv. Investment and operating expenses associated with the publicly available charging station will be assigned to an Electric Vehicle customer class.

Information to support of a finding of conformance with the above criteria includes but is not limited to:

- Evidence that the proposed EVSE is at a "threshold" location essential to fill a gap on an important travel corridor that is otherwise adequately served,
- Data showing how providing service in that location will enable private EVSE providers to serve other locations competitively,
- Any special designation of the travel corridor in question, and
- Information on whether there was any open season for third parties, or a discussion of why third parties cannot serve the location.

II. Electric Rate Schedules for Electric Vehicle Charging

1. Portland General Electric (PGE) and Pacific Power (PPL) shall within six months of the date of this Order file a new rate schedule applicable only to EV charging. The tariff shall be consistent with the design principles set forth at Attachment B.

2. The EV tariff shall apply only to EV charging at 220 V or higher (level 2). Charging at 110V (level 1) shall not be subject to the EV tariff.

3. Notwithstanding guideline II.1 above, all electric utilities in Oregon shall include amendments to their existing tariffs that remove any restrictions on third-party providers of electricity to the public for the purpose of charging EV batteries.

III. Costs of Local Distribution Upgrades

Existing policies governing cost allocation for distribution upgrades, including but not limited to line extensions and new connections, shall apply to upgrades or additions to distribution components that serve newly installed EV charging equipment. Guideline III applies regardless of whether the EV charging equipment is owned by an unregulated utility affiliate and regardless of whether the EV charging equipment is privately used or is available for public use.

IV. Reporting the status and cost of technology to implement smart charging

Public utilities shall, within six months of the date of this Order, provide an assessment of the cost of devices and procedures that could enable the utility to actively control the rate of power delivery to individual EVSEs in response to grid conditions (smart charging). The assessment shall include the costs to design and perform a smart charging pilot that customers on either the separate EV rate schedule or the whole-premise time-of-use option would participate in voluntarily.

V. Information on Carbon Dioxide Emissions from EV Charging

Public utilities shall provide information to retail customers who own an EVSE on the typical generation resource and carbon dioxide emissions rate averages over the time intervals that make up the on-peak, shoulder and off-peak periods of the EV rate schedule described in Guideline II.

VI. Analysis of Flexible Capacity in Integrated Resource Plans

With Integrated Resource Plans filed in 2013 and thereafter, public utilities shall provide the following information:

1. **Forecast the Demand for Flexible Capacity:** The electric utilities shall forecast the balancing reserves needed at different time intervals (e.g. up and down ramping needed within 5 minutes, 30 minutes, etc.) to respond to variations in load and intermittent renewable generation over the 20 year planning period.

2. **Forecast the Supply of Flexible Capacity:** The electric utilities shall forecast the balancing reserves available at different time intervals from existing generating resources over the 20 year planning period.

3. **Evaluate Flexible Resources on a Consistent and Comparable Basis:** In planning to fill any gap between the demand and supply of flexible capacity, the electric utilities shall evaluate all resource options, including the use of EVs and other demand response options, on a consistent and comparable basis.

Attachment B - EV Rate Design Principles

The purpose of these principles is to provide guidance on developing the new EV rate schedule.

1. The EV rate will only apply to energy supplied from the public utility for a Level 2 or Level 3 EVSE[1] used to charge an EV (and possibly supply a reasonable amount of auxiliary power to operate EVSE depots) irrespective of location or ownership, except as noted in (2) below.

2. Residential and small commercial customers who choose to place their premises on the TOU option offered in current rate schedules may, at their option, operate Level 2 or Level 3 EVSEs without choosing the EV rate schedule outlined in (1) above. All other customer classes who own and or operate Level 2 and Level 3 EVSE are required to meter and apply the EV rate to all energy used for charging EVs regardless of whether it is used to charge vehicles owned by the customer, by employees, or is available for public use either for free or at a price set by the EVSE owner.

3. EV Rate Schedule Design Principles:

    a. It will contain three time-differentiated EV energy rates: off-peak, on-peak, and a shoulder period.

    b. Each customer subject to the EV tariff will pay a nominal monthly fixed meter (service) charge for either a stand-alone EV meter or sub-meter if required. Absent incremental cost information to the contrary these charges shall be a $3 per month fixed charge if the meter is a sub-meter or $9 per month if the EV meter is stand-alone.

    c. Off-peak energy rates shall be based on the forecasted cost of wholesale energy for light-load hours.

    d. The on-peak rates shall at a minimum reasonably approximate the long-run incremental cost (LRIC) of serving on-peak EV consumption.

    e. The shoulder energy rate should be approximately half-way between the on-peak and off-peak energy rates. In order to achieve a reasonable shoulder rate, the utility may make whatever modifications to the guidance above that produces a shoulder energy rate consistent with the guidance above.

    f. Distribution and transmission costs will only be assessed to on-peak consumption.

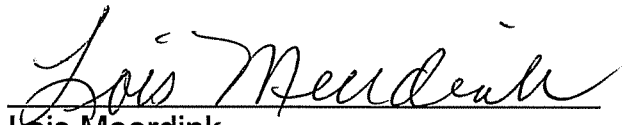
[1] Level 2 EVSE is an EVSE that supplies power to the vehicle at a nominal 220VAC. Level 3, also referred to as DC Quick Charging, supplies power at nominal 480 volts DC

CERTIFICATE OF SERVICE

UM 1461

I certify that I have this day served the foregoing document upon all parties of record in this proceeding by delivering a copy in person or by mailing a copy properly addressed with first class postage prepaid, or by electronic mail pursuant to OAR 860-001-0180, to the following parties or attorneys of parties.

Dated this 1st day of April, 2011 at Salem, Oregon.



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UM 1461
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