



UM 1461 – Electric Vehicle Charging Rates and Infrastructure

OPUC Staff Opening Comments

August 27, 2010

Background

The Public Utility Commission (OPUC or Commission) initiated Docket No. UM 1461 in December 2009. Staff has held two public workshops and thanks parties for their participation.

On July 22, 2010 staff issued a “Straw Proposal” listing possible policies on the role of public utilities in development of EV charging infrastructure and the rate structures for EV charging. As stated in the straw proposal, those positions were not staff positions but were meant to serve as a framework for comments by all parties.

Opening Comments

Attached are staff’s opening comments in this investigation. The policies described here are not all identical to those that appeared in the straw proposal. Staff has attempted to address some of the concerns raised in the workshops.

Purpose of these Comments

These comments provide an initial position on legal issues, investments by public utilities that are necessary to support the initial development of EV charging infrastructure, rate structures for EV charging, and the potential for EV’s to provide ancillary services in the future.

Staff took into consideration the input we received at the two public workshops. We anticipate comments from other parties with different points of view and new and clarifying information. Staff is open to discussion, and in future comments may modify these initial positions based on discussion with other parties, new information and further consideration of the issues. Staff’s final positions will not necessarily be the same as the positions in these opening comments.

Next Public Workshop

The next public meeting will be a Commissioners’ workshop on September 9, 2010 at the PUC building in Salem. The Commission will issue notice of that workshop to all parties. Its purpose will be to discuss the positions in comments from all parties, brief the Commissioners on the positions of the various parties, and answer questions that the Commissioners may have.

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BEFORE THE PUBLIC UTILITY COMMISSION OF OREGON

UM 1461

In the Matter of an Investigation into
Electric Vehicle Charging Rates and
Infrastructure

STAFF'S OPENING COMMENTS

Introduction

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

In recommending that the Commission open docket UM 1461, staff reported that the purpose of the investigation would be to:

- Determine the appropriate rate structure for EV charging; and
- Investigate the impact of EV charging on the utility, and determine the level of involvement a utility should have in providing EV infrastructure and how the utility can recover its prudent costs.

The timing and scope of this investigation are influenced by two developments:

- The Alternative Fuel Vehicle Infrastructure Working Group (Working Group), created by governor's Executive Order EO 08-24. In its Final Report, the Working Group stated that electrifying the transportation sector was a state policy, consistent with state goals to reduce carbon dioxide emissions.¹
- An EV pilot study funded by the U.S. Department of Energy (USDOE) and conducted by Ecotality Inc., commencing in November 2010. Participating EV owners will receive free EV charging equipment and will have access to free charging at 1,200 publicly available EV charging stations in northwestern Oregon. Ecotality will gather data on the participants' driving and charging habits. Idaho National Laboratory will collect the data from Oregon and six other test markets and issue a report that will help plan for EV charging infrastructure in the future.

¹ The Working Group made specific recommendations for the PUC. See Final Report of the Governor's Alternative Fuel Vehicle Infrastructure Working Group, February 2010.

Two purposes of this investigation, therefore, were to be consistent with the state policy embodied in the Executive Order and to give the EV pilot study sponsors some certainty regarding PUC regulatory policy within the timeframe of the study.

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.

After hearing the stakeholders' concerns at the June 22 workshop, staff issued a straw proposal on July 22, 2010. The straw proposal was not a staff position but rather a framework and catalyst for comments from all parties, including staff.

On August 6, 2010 staff held a second workshop to discuss the straw proposal and answer questions. Staff developed these opening comments after taking into account the input from parties at the workshops. The policies articulated in these opening comments are not necessarily the policies in the straw proposal.

In these opening comments:

“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 defined at ORS 757.005.

I. Goals and Objectives

In its June 22, 2010 straw proposal, staff proposed the following goals that the Commission could use to guide development of specific regulatory guidelines:

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.

Discussion

Staff believes the goals in the straw proposal are appropriate. Staff further believes that goals (1) and (2) address the major issues raised by stakeholders at the workshops.

The first goal addresses the need to develop public charging infrastructure. Customers may not buy EV's without convenient publicly available recharging infrastructure. The public utilities have an important role in jump starting the development of publicly available charging infrastructure. However, in the long term staff believes a competitive market for public charging service should be allowed to develop. At the public workshops, all participants agreed that the business model for public charging service is not known yet and could be different from the models contemplated right now. Staff believes the Commission's policies at this point should keep all options open.

The second goal addresses the effect that EV charging could have on the grid. This effect could be adverse or beneficial depending on the time of day that EV owners charge their vehicles. EV batteries could ultimately become a source of electricity storage available for load balancing and regulation. Projections by the Oregon Department of Energy and Portland General Electric show EV's having a small impact for about 10 years. However, staff believes public utilities will have to work to ensure the EV charging load complements system loads. Therefore, considering scenarios with varying levels of EV market penetration would be prudent long range planning.

Goal (3) is a reminder of the Commission's traditional ratepayer protection role.

II. Legal Issues

In its straw proposal, Staff identified the following legal questions that must be addressed to provide a firm legal foundation for its regulatory policies²:

1. What federal or state laws apply when an entity buys power from a public utility and sells or provides EVSE charging services to the public?
 - a. In answering question (1), discuss whether such an entity would be a "public utility" under ORS 757.005 subject to PUC regulation

² For the purposes of these questions, "selling or providing charging services" means an EVSE service provider selling or providing power for the sole purpose of charging EV's.

when it buys power, for the purpose of providing or selling EVSE charging service, either: (i) from a public utility at the PUC-regulated rate or (ii) on the wholesale market. For question (1)(a)(i), discuss any federal or state laws that may apply when an EVSE service provider buys power from a public utility at the PUC-approved retail rate and sells it at a different price for the purpose of EV charging.

- b. In answering question (1), discuss whether an entity that sells or provides power as described in question (1) (a) would be an “Electric Service Supplier” (ESS). In responding to this question, consider the implications, if any, of Commission Order 08-388.
2. If there are laws that apply to an EVSE service provider who buys power and sells or provides EVSE charging services to the public, could the EVSE service provider avoid the application of any applicable laws by adopting pricing models such as:
 - a. Memberships where the EV driver pays a flat monthly fee;
 - b. Implementing a convenience charge where the driver pays a flat fee for the EVSE charging service regardless of kwh’s used;
 - c. Offering other services such as having an attendant;
 - d. Offering free EVSE charging service with validation by a local business; or
 - e. Other?

Discussion

At the June workshop, participants identified “lack of regulatory certainty” as a key concern for public utilities and independent EVSE service providers. Of particular concern was the jurisdictional status of third party EVSE service providers.

Staff has identified the following four primary legal considerations: (1) is an EVSE provider a “public utility” under Oregon law, (2) is an EVSE provider an “Electric Service Supplier” (ESS) under Oregon law, (3) are there any legal constraints to an EVSE provider selling electricity to the EV owner, and (4) is the sale of electricity by a public utility to the EVSE provider subject to regulation by the Federal Energy Regulatory Commission (FERC)?

The analysis that follows was provided to staff by the Oregon Department of Justice. In brief summary, the answer to the first two questions is straightforward: under “typical” circumstances, the EVSE provider would not be either a public utility or an ESS provider.³

³ These conclusions are based upon the business model that staff expects to be used in the “usual” case as described in the text of these comments. Of course, should a business model

The answer to the third question, while somewhat more complicated, is also “no.” There is no apparent statutory constraint against an EVSE provider selling electricity to an EV owner. However, all three utilities have tariffs that prohibit, in one manner or another, the resale of electricity. The utilities should amend their tariffs to expressly clarify that they do not apply to the sale of electricity by an EVSE provider to EV owners.

Finally, the answer to the fourth question is “maybe.” It is possible FERC may view this type of sale as a type of wholesale sale of electricity subject to its regulatory powers. However, staff identifies several arguments against such a conclusion.

A. Public Utility Considerations

ORS 757.005 defines the term “public utility.” In relevant part, a public utility is: “Any corporation, company, individual...that owns, operates, manages or controls all or part of any plant or equipment in this state for the production, transmission, delivery or furnishing of...power, directly or indirectly to or for the public.” ORS 757.005(1)(a).

ORS 757.005(1)(b) provides a list of exemptions from the definition of “public utility.” Of particular relevance is ORS 757.005(1)(b)(G), which states that “public utility” does not include:

“Any corporation, company, partnership, individual or association of individuals that furnishes natural gas, electricity, ethanol, methanol, methane, biodiesel or other alternative fuel to any number of customers for use in motor vehicles *and does not furnish any utility service described in paragraph (a) of this subsection.*” (emphasis added).⁴

This exception seems to clearly apply to an EVSE provider when it “furnishes” electricity to an EV owner (so long as it does not also furnish a “utility service” as observed in footnote 4).

Before leaving this issue, staff notes that “furnishes” as used in ORS 757.005(1)(b)(G) is a term capable of broad meaning. A common definition for “furnish” is “to supply one with what is needed.” See Webster’s Ninth New Collegiate Dictionary at 499 (1984). One method for an EVSE provider to furnish power for an EV is for the EVSE owner to buy electricity (at wholesale or retail) and then provide the electricity to the EV owner. Another possible method would

significantly depart from that assumed, the conclusion may differ. See, e.g., discussion at footnote 4.

⁴ As stated in footnote 3, the conclusions offered in these opening comments are based upon a typical EVSE charging station business model of obtaining (or generating) electricity and selling it to an EV owner. The emphasized language from ORS 757.005(1)(b)(G) states that the exception is lost if an EVSE owner engages in other activities that qualify as “utility service” under ORS 757.005(1)(a). Other than bringing this limit to the (1)(b)(G) exception to the parties’ attention, staff will not explore its possible application in these comments.

be for the EVSE to generate the electricity itself and provide it to the EV owner. The term “furnishes” appears broad enough to cover both of these circumstances.

B. ESS Considerations

The second major consideration is whether an EVSE owner may be considered an ESS subject to regulation under ORS 757.600 to 757.689. The Commission earlier considered the circumstances surrounding the definition of ESS in its Order 08-388. Generally, under the Order, the EVSE is not considered to be an ESS unless it provides “ancillary services”⁵ or uses a utility’s distribution system when it provides power to the EV owner. Under the assumed business models, the EVSE owner will not be providing ancillary services or using the utility’s distribution system to provide power to the EVs. As such, the EVSE owner under these circumstances would not be an ESS subject to Commission regulation.

C. Sale of Electricity by EVSE Provider to EV Owners

The third major issue to consider is the possibility of other legal constraints on the sale of electricity by an EVSE provider to EV owners.

The one possible state statutory constraint appears to be the “territorial allocation statutes” found at ORS 758.400 to 758.475. Generally, these statutes prohibit a person from “providing a utility service” in a territory that has been allocated to another person. There is no need to analyze the meaning of the quoted phrase in the present circumstances because ORS 757.005(1)(b)(G) implicitly provides that “utility service” does not include the furnishing of electricity for use in motor vehicles. Thus, the territorial allocation statutes would not seem to be applicable.

Each of the three utilities participating in this docket has a tariff that generally prohibits, using slightly different language, the “resale” of electricity by a utility’s customer. In light of ORS 757.005(1)(b)(G), which expresses the legislature’s intent that such sales should be permitted, there is a strong argument that such tariffs do not apply to EVSE providers furnishing electricity to EV owners. However, to remove any doubt about their possible application to EVSE providers, staff recommends that the utilities amend each such tariff to clearly allow for the furnishing of electricity by an EVSE provider to EV owners.

D. Sale of electricity to EVSE Provider for furnishing to EV Owners

A final question is whether the sale of electricity to an EVSE provider by a public utility, which will then furnish it to an EV owner, would be regulated by FERC.⁶ The issue arises because 16 U.S.C. § 824, *et seq.* grants FERC exclusive authority over interstate sales of electricity for resale by public utilities (also

⁵ “Ancillary services” are defined in ORS 757.600(2) as “...services necessary or incidental to the transmission and delivery of electricity from generating facilities to retail electricity consumers, including but not limited to scheduling, load shaping, reactive power, voltage control and energy balancing services.”

⁶ Southern California Edison raised this possibility in its Opening Brief, February 8, 2010, CPUC rulemaking R0908009, <http://docs.cpuc.ca.gov/efile/BRIEF/113595.pdf>

known as “wholesale sales”). If the sale of electricity by a utility to an EVSE provider for furnishing to an EV owner is viewed as a resale of electricity, then FERC may assert jurisdiction over the transaction.⁷

The California Public Utilities Commission (CPUC) presented an argument as to why FERC should not attempt to assert its jurisdiction over such a transaction. In its Final Decision on Rulemaking R0908009, July 29, 2010, the CPUC stated “...A charging service provider that is connecting to the transmission or distribution system of an investor-owned utility will, at the very least, be a retail transmission and distribution customer of the utility.” The CPUC concluded that “...a seller of electric vehicle charging services that purchases electricity from an investor-owned utility is an end-user that purchases the electricity at retail. Thus, the sale of electricity by an investor-owned utility to an electric vehicle service provider is a retail sale of electricity, not a wholesale sale or a “sale for resale.” This means that the sale falls under the exclusive jurisdiction of the California Public Utilities Commission, not under the jurisdiction of FERC.”

Another possible argument in support of a lack of FERC jurisdiction is to view the transaction as the sale of something other than “electricity.” While staff has not yet reached a conclusion about the validity of such a position, if FERC was of this viewpoint, then presumably it would not attempt to assert jurisdiction over the transaction.

For example, ORS 757.005(1)(b)(G) uses the phrase “alternative fuel.” While this phrase is used in the context of excepting an EVSE provider from the definition of “public utility,” FERC may reasonably view the transaction as involving the sale of an “alternative fuel.”

Under the law, the phrase “alternative fuel” is viewed as either an “exact term,” an “inexact term” or a “term of delegation.” See *Ross v. Springfield School Dist. No. 19*, 294 Or 357 (1982); *Springfield Education Assn. v. School District*, 290 Or 217 (1980). The Commission has authority to interpret inexact and delegated terms but not exact terms. *Id.* Without going into extensive legal analysis in these opening comments, staff’s legal counsel advises that the Commission has authority to interpret and apply the phrase “alternative fuel” as either an inexact term (in which the interpretation must be consistent within the completed policy expressed by the legislature) or a delegated term (which is viewed as non-completed legislation, allowing the Commission broader interpretative range).

In the context of the present docket, the question becomes whether the sale of EVSE charging services to an EV owner may reasonably be interpreted as the sale or provision of an “alternative fuel.” The concept would be that the EVSE owner sells or provides more than just “electricity.” The EVSE owner sells or provides electricity with “value added.” The “extra value” would, or could include

⁷ Staff does not explore in these comments what impact, or requirements, arise if FERC has jurisdiction over such a transaction.

the investment the provider has made in purchasing and installing EVSE equipment. The public utility is obliged to serve the electrical load but is not obliged to install equipment specifically for vehicles. If third parties install such equipment and provide a convenient location for EV owners, then the installation and location are the added value.

Finally, from a policy viewpoint, staff notes that the furnishing of electricity by an EVSE provider to an EV owner is not a normal or typical sale of electricity. An EV owner can drive to a competing EVSE provider should it choose to do so. This is unlike the typical electric customer end-user.

To summarize this section, staff observes there is a real possibility FERC may attempt to assert jurisdiction over EVSE transaction at issue here. Without endorsing any particular position at this time, staff observes there are reasonable arguments that would support a decision by FERC to not assert jurisdiction over such transactions.

III. Regulatory Policies and Guidelines

A. Policies related to developing charging infrastructure

In this section staff addresses the first goal, development of adequate charging infrastructure. This includes EVSE charging stations located in public places such as shopping centers, parking lots or curbsides. Staff refers to these as “publicly available EVSE stations.” They are available for use by any EV driver.

Charging infrastructure also includes EVSE’s located at the vehicle owners’ places of residence or business, solely for use by the property owner or the owner’s tenants or employees. We refer to these as “private” EVSE stations.

Two key questions for development of EV charging infrastructure are:

- (i) who will invest, now and in the future, in the necessary infrastructure and how might the OPUC support the development of that infrastructure, and
- (ii) how should investments by public utilities be recovered?

Staff proposes the following policies:

1. **Utility Ownership and Operation of EVSE Stations:** Public utilities may own and operate publicly available EVSE stations. Costs, including but not limited to the design, installation, operation or maintenance of publicly available EVSE stations shall not be recovered in rates. Power supply to any utility owned publicly available EVSE station shall be charged at the same PUC approved rate as would apply if the publicly available EVSE station were independently owned. Electric rates and other charges such as connection charges shall not be so high as to place independent EVSE service providers at a competitive disadvantage.

2. **Cost of Distribution Upgrades or Reconfigurations:** Existing policies governing cost allocation for distribution upgrades or reconfigurations, including but not limited to line extensions and new connections, shall apply to new infrastructure requirements for publicly available EVSE service. Reasonable costs associated with the implementation of separate rate schedules for EV charging, including separate metering, billing, data collection or other EV related administration costs, shall be recovered from all the utility's customers.

Discussion

The Commission faces a dilemma in determining the role of public utilities in developing EVSE infrastructure. The business model for publicly available EVSE service is not yet clear. Until EV's achieve sufficient market penetration, independent public EVSE service providers may have difficulty raising the capital to build a robust public charging infrastructure. Both the Working Group and USDOE have asked if public utility investments are needed to jump start public charging infrastructure development in the short run. The goal is to enable initial investment to jump start infrastructure development while allowing a transition to a competitive market as the industry matures. Staff recommends that in its policies the OPUC try not to inadvertently foreclose future options.

Recent developments suggest that a competitive market in public EVSE service is already developing. The USDOE has provided over \$200 million towards installation of EVSE service in seven test markets. California has invested an additional \$80 million. Washington Department of Transportation has announced that it will install charging stations along Interstate 5. A number of companies (Ecotality, Better Place, Coulomb) are already entering the public EVSE business. These facts suggest that a network of publicly available EVSE stations can be installed with or without the public utilities' direct entry into the public EVSE service market. Staff suggests public utilities may enter the public EVSE service market as an unregulated competitor, but does not believe that investments in entering that market should be recovered in rates. And, the Commission will need to ensure that public utilities do not assess charges that put independent EVSE service providers at a disadvantage.

However, public utilities remain obligated to provide electric service and distribution to support a network of public EVSE's. At the workshops, the public utilities stated that their primary concern was cost recovery for needed upgrades in local distribution and metering. Staff considered the question of whether costs of local distribution upgrades should be recovered from EV drivers or from ratepayers generally. At the workshops, the public utilities stated added loads from EV charging are not fundamentally different from added loads due to other expansions. The utilities already have established policies regarding line extensions, new service and expanded service. Staff therefore proposes that upgrades to local infrastructure caused by the installation of EVSE's be treated

the same way as expansions in other loads. That means local distribution upgrades caused by installation of EVSE stations would be rolled in with upgrades caused by other increases in electrical service in residential or commercial zones.

Staff believes the two policies suggested above address the OPUC's role in assuring adequate initial investment in EV charging infrastructure while allowing a transition to a competitive market.

B. Policies related to the impact of EV charging on the grid

In this section staff addresses the second goal: managing impacts of charging on the distribution network and the utility's overall load profile. Those impacts could be adverse or beneficial depending on the time of day that the EV's are charged. EV owners who charge at their homes or businesses have flexibility in choosing when to charge. Rate structures that include a Time of Use component or a Smart Charging⁸ option may be effective in moving EV charging load to off peak periods. Staff therefore proposes the following policies for EV charging rates:

1. **Rate Schedules for supply of power to EVSE's:** as set forth in Attachment A to these comments.
2. **Optional utility ability to control charging rate ("dispatchable charging")** Public utilities shall by July 2011 provide an assessment of the costs of the devices to support a separate rate schedule, or an option within the rate schedule developed under III.B(1) above, that gives the public utility the ability to actively control the charging rate during peak load periods. Such control may include the right of the public utility to reduce or interrupt power flow for EV charging.
3. **Information on emissions to customers:** Public utilities shall provide private EVSE owners with information on the typical generation resource mix and CO2 emissions rates using the same time differentiation used in the EV charging rate schedule in III.B(1).

Discussion

EV penetration may eventually reach a level where it has a measurable impact on the utility's load profile.⁹ While no one can predict when this might happen, we propose steps in this docket to anticipate the impacts of EV charging.

Shifting EV charging to off peak periods will better utilize existing generation and transmission resources. Moreover, market research predicts EV's will likely

⁸ "Smart Charging" means the utility can vary the time and speed of charging in response to other grid conditions. Smart charging could result in reduced charging speed during peak load periods.

⁹ PGE's 2009 Integrated Resource Plan estimates that the overall peak load impact of EV charging is about 25 aMW for up to 5% EV adoption. ODOE, in the July and August workshops, predicted that 5% penetration is not expected until 2020. ODOE characterized this as an "aggressive" forecast. See PGE IRP section 3.5

concentrate in certain zipcodes. A high adoption rate in one zipcode could create the need for local distribution upgrades if everyone charges at the same time. Finally, EV penetration may reach the level where they could become a source of ancillary services.

To mitigate these impacts and anticipate these opportunities, staff proposes a separate customer class for EVSE's. A separate EVSE rate schedule allows the Commission to incent off peak charging through concepts such as time of use pricing and "smart charging" without affecting rates for other end uses.

Attachment A of these comments shows rate design principles that staff finds appropriate.

A separate EV rate is consistent with the policies proposed in section III.A above. A single rate applicable to all EVSE's will not give any public charging business model an advantage over others. Staff recognizes that utilities have not previously supported end-use rates. However, there are already separate customer classes for streetlights and irrigation. And, EV's are a unique end use because they are a new market with features not found in other end uses.

Staff considered whether to propose a single EV rate schedule or separate rate schedules for public and private charging. For private charging, the electric bill is paid directly by the EV driver. For public charging the electric bill is paid by the EVSE service provider and passed on to the EV driver, possibly in addition to other costs that are not regulated.¹⁰ In addition, EV drivers charging at their own premises have more ability to choose the time of charging, while public EVSE service customers are charging their cars while away from home. This suggests that for purposes of shifting load to off peak, a price signal will be more effective for private charging than for public charging.

However, after much consideration, staff proposes a single EV rate schedule for all EV charging. We propose this partly to reduce the complexity in designing new rate schedules. Also, the cost to serve the EV charging load is no different for private and public EVSE's. Therefore, a single rate schedule is more equitable.

In considering whether a special EV rate is appropriate, it is useful for the Commission to keep some of the following background facts in mind:

- A person driving 1,000 miles per month and paying 8 cents per kwh would pay about \$20/month for the electricity to charge their EV. This dollar figure gives some idea of how effective a price signal alone might be.

¹⁰ For example, a "level 2" EVSE costs about \$3,000 to procure and install. A "level 3" EVSE currently costs about \$30,000 to procure and install.

- EV penetration will likely not be sufficient to affect the grid for several years. Therefore, any policy to promote off peak charging, whether by price incentive or direct utility control, is intended primarily as a test bed.

Staff is mindful of the concerns raised in previous Commission dockets regarding time of use rates. However, EV's may be an ideal candidate for this concept. The EV owners have flexibility in choosing when to charge. The vehicles already have the "smart" software anticipated in other appliances, and with level 2 charging a full charge can be achieved in 4 hours. Staff believes EV charging is a unique end use that merits a unique rate design.

A separate customer class might require separate submetering¹¹. Staff proposes that the cost of submetering and other costs associated with separate billing and administration be recovered from ratepayers in general. The principal benefit of time of use rates is more efficient utilization of existing generation, transmission and distribution and potential to delay new investments in these assets. These benefits accrue to all ratepayers.

As noted above, price signal alone may not produce sufficient load shifting. At the June workshop, an EPRI representative described research indicating that adverse local grid impacts are not reduced if everyone charges as soon as the off peak rate applies. For that reason, staff considered proposing direct utility control (or "dispatchable" charging). The utility could stagger EV charging among different houses or businesses to even out the load.

There are two potential roles for utility control of EV charging:

1. To address the tendency of TOU rates to encourage all EV charging to start when the off-peak period begins.
2. To apply demand response measures to EV charging loads to provide low-cost capacity or ancillary services.

At this time staff does not believe EV penetration is sufficient to affect the load. The potential for smart charging and EV's as a source of ancillary services may not be realized until after 2020. In section III.C, staff recommends that utilities consider the feasibility of smart charging in integrated resource plans.

However, staff does recommend that utilities begin now to assess the costs of dispatchable charging. The benefit of utilities exercising control sooner rather than later would be to perfect the practice before EV charging becomes a significant problem on the distribution system. Combining utility controls with TOU rates to avoid a surge in load at the beginning of the off-peak period will be complex. It may take several iterations to perfect the practice. Developing best practices in controlling EV loads to acquire capacity or ancillary services will take

¹¹ In the future the submeter might be built in to the car or the EVSE. In time, Smart Meters may have the ability to distinguish between EV charging and other loads. But at this time we cannot assume all cars, EVSE's or advanced meters have that capability.

several years. It would be prudent to begin estimating the costs now. After estimates are available, the Commission can decide if it is appropriate to order a utility to submit a rate schedule or tariff option for utility control.

The Citizens Utility Board (CUB) commented that EV owners may have an EVSE located close to a normal electrical outlet. CUB stated that EV owners could “game” the different rate schedules by charging their car or running other appliances from whichever outlet has the lower rate at the time. Staff addresses this concern by excluding level 1 from the separate customer class. Current draw for Level 1 charging is similar to other common household appliances and should not have much load impact. Moreover, applying a special EV rate to level one would affect NEV’s¹² and in-house industrial EV’s such as forklifts and airport runway vehicles, which was not a goal for this investigation. “Gaming” level 2 charging would take more effort from the EV owner because it uses a unique plug¹³. Some gaming remains possible, but a small amount of gaming should not be a primary driver in meeting the larger goals of this investigation.

Finally, at the July and August workshops, NW Energy Coalition supported providing information to EV customers regarding the resource mix and emissions profile associated with charging at different times of day. Staff supports the concept that EV customers need information in order to make informed decisions about when to charge. This is more of a concern for private charging, because EV owners can program their chargers and have flexibility in when to charge. However, staff does not at this time propose detailed and prescriptive requirements. Our recommendation is simply that utilities make information available readily available to those who seek it.

C. EV’s as a provider of Ancillary Services

Staff has identified the following Integrated Resource Planning guidelines to address the potential for EV’s to provide ancillary services for the integration of renewable generation.

1. **Forecast the Demand for Flexible Capacity:** The electric utilities shall forecast the balancing reserves needed at different time intervals (e.g. ramping needed within 5 minutes) to respond to variation 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 (e.g. ramping available within 5 minutes) from existing generating resources over the 20 year planning period.

¹² Neighborhood Electric Vehicles (NEV’s) include small battery operated vehicles with low speed and limited range. Such vehicles can charge on 110V. They are already common, have small grid impact and are not the primary reason for this investigation.

¹³ The Society of Automotive Engineers adopted a standard plug design (J1772) to ensure interoperability among EV and EVSE manufacturers. This plug also has some safety features.

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 EV's, on a consistent and comparable basis.

Discussion

At the July and August workshops, the notion of EV's as a source of ancillary service drew mixed comments. Utilities and ODOE pointed out that EV's are unlikely to have sufficient penetration to have meaningful impact for at least ten years. NW Energy Coalition strongly supported the introduction of smart charging as a first step in the near future. EPRI commented that early introduction of some futuristic policies such as smart charging might be a useful precedent.

Staff carefully considered the comments at the workshops and concluded that the time is not ripe to aggressively introduce concepts such as Vehicle to Grid (V2G). Staff was influenced by the PGE IRP statement that 5% penetration is needed for EV's to have a meaningful impact. Concepts such as V2G with EV penetration level less than 1% may not even have much value as a test bed and would be challenging to implement.

However, staff believes that planning for the day when EV's can provide ancillary services could begin now. Some optimistic estimates show EV penetration up to 5% by 2020. A ten year time frame is within the time frame of integrated resource plans.

For that reason, staff believes the IRP provides a good opportunity for public utilities and the Commission to periodically review the potential for EV's as a provider of ancillary services.

Dated at Salem, Oregon this 27th day of August, 2010



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ATTACHMENT A -- UM 1461 STAFF OPENING COMMENTS

EV Rate Design Principles

1. The power delivered to level 2 or higher EVSE stations on a customer's site will be separately metered. These customers will form the EV customer class.
2. The revenue requirements for the EV customer class will be based on the normal principles used to spread overall revenue requirements to customer classes. For the initial tariff the costs of EV sub-meters will be spread to all customer classes.
3. If the EV meter is a sub-meter to another account, the energy use on the EV meter will be deducted from the main meter. EV energy use will be charged seasonal/time-of-use (TOU) rates. There will be three uniform EV rates per kWh: an off-peak rate, an on-peak rate and a shoulder rate. These three rates plus the fixed monthly charges per meter will be set to collect the EV class revenue requirement.
4. Each EV customer will be charged a \$3 per month fixed charge if the meter is a sub-meter or \$9 per month if the EV meter is stand-alone.
5. The off-peak period will be 10 pm to 6 am plus Sundays and Federal holidays. The off-peak rate will be set at the forecasted cost of delivered wholesale power for the off-peak hours. Absent better information on the load shape of the EV off-peak loads, the utility may assume a flat off-peak load.
6. The on-peak rate will reasonably approximate the long-run incremental cost (LRIC) of serving a flat load in the on-peak hours for the two seasons, subject to a reasonable shoulder rate. A shoulder rate is reasonable if it is intermediate between the on-peak and off-peak rates.
7. Absent better information on the LRIC of serving on-peak hour loads, the utility may set the on-peak rate at the full cost of a serving a flat load in the on-peak hours with a new gas fired simple-cycle combustion turbine (SCCT), subject to achieving a reasonable shoulder rate.
8. In order to achieve a reasonable shoulder rate the utility may vary the number of on-peak hours or the share of the levelized cost of the SCCT power plant allocated to on-peak loads. If these adjustments are not sufficient to achieve a reasonable shoulder rate, the utility may make other adjustments to the on-peak rate consistent with setting the on-peak rate as close to LRIC as possible.

CERTIFICATE OF SERVICE

**UM 1461
Opening Comments**

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 860-13-0070, to the following parties or attorneys of parties.

Dated at Salem, Oregon, this 27th day of August, 2010.



Kay Barnes
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Regulatory Operations
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UM 1461
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