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December 18, 2014

Attention: Filing Center
Public Utility Commission of Oregon
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Re: *In the Matter of PUBLIC UTILITY COMMISSION OF OREGON Investigation into Qualifying Facility Contracting and Pricing*
OPUC Docket No.: UM 1610
DOJ File No.: 860115-GB0532-12

Enclosed for filing with the Commission today are an original and five copies of STAFF BRIEF with Certificate of Service/Service List.

Sincerely,

Stephanie S. Andrus
Senior Assistant Attorney General
Business Activities Section

Enclosures
SSA:kt2/DM6106843
c: UM 1610 Service List

BEFORE THE PUBLIC UTILITY COMMISSION OF OREGON

UM 1610

In the Matter of the Investigation of the PUBLIC UTILITY COMMISSION OF OREGON Into Qualifying Facility Pricing and Contracting.	STAFF BRIEF re: CAPACITY CONTRIBUTION ADJUSTMENT FOR STANDARD RENEWABLE AVOIDED COST PRICES

I. Introduction

In Phase I of this investigation into qualifying facility (QF) contracting and pricing, Staff of the Public Utility Commission of Oregon (Staff) recommended that the Commission modify the methodology for calculating standard non-renewable and renewable avoided cost prices offered during resource deficiency periods so that the prices reflect the inherently different contributions to meeting peak load of different QF resource types. For standard renewable avoided cost prices, Staff recommended a capacity contribution adder based on the QF resource type's contribution to meeting the utility's peak load. The Commission adopted Staff's recommendation in Order No. 14-058.[1]

Staff now recommends that the Commission revise the methodology for determining the capacity contribution adder for solar QFs selecting standard renewable avoided cost prices ("the Current Method") because it does not do what was intended.[2] Under the Current Method adopted in Order No. 14-058, solar QFs do not receive compensation for capacity provided during on-peak hours in the utility's deficiency period that is commensurate with the value of that capacity. Instead, solar QFs receive a lesser amount that is not correlated to the value of

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[1] Order No. 14-058 at 2, 15.

[2] Staff also recommends that the Commission modify the methodology for determining avoided capacity prices for standard non-renewable rates. However, this recommendation will be presented in Phase II testimony currently due in February 2015.

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their contribution to the utility's peak load (hereinafter referred to as "contribution to peak" or "CTP").

The flaw in the Current Method with respect to solar QFs is that the determination of the capacity costs that are avoided is based on the operating characteristics of a solar resource, but the design of the rate used to pay those costs to QFs is not.[3] Instead, the avoided capacity costs are spread evenly across all on-peak hours with a volumetric megawatt-per-hour (MWh) rate (price) based on the characteristics – specifically, the on-peak capacity factor (CF) – of a Combined Cycle Combustion Turbine (CCCT).[4] Staff recommends that the Commission modify the Current Method for determining the capacity contribution adder for solar QFs so that both the amount of avoided capacity costs and the volumetric rate are based on the characteristics of a solar resource.[5]

The flaw in the Current Method does not affect avoided capacity payments to wind resources selecting standard renewable avoided cost rates because these QFs are the same type of resource as the avoided proxy resource and therefore, no adjustment to avoided capacity payments is made. This flaw does not affect avoided capacity payments to baseload renewable resources selecting standard renewable avoided cost rates because their generating characteristics are essentially the same as a CCCT.

II. Argument

A. The Commission's traditional rate design for avoided cost prices is based on the characteristics of a CCCT.

In Oregon, the calculation of standard avoided cost prices has long been differentiated by the utility's resource position.[6] For periods when the utility is forecasted to be resource

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[3] Staff/300, Andrus/7.

[4] *See* Staff/400, Andrus/4. *See also* PacifiCorp/600, Duvall/2.

[5] Staff/400, Andrus/8-9.

[6] *See* Order No. 05-584 at 24.

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deficient, avoided cost prices include both the variable and fixed costs of a planned resource in order to reflect the actual deferral or avoidance of that resource. In periods of resource sufficiency, avoided costs do not include fixed costs of avoided resources.[7]

To determine this fixed cost (capacity) portion of standard avoided cost prices, Portland General Electric Company (PGE) and PacifiCorp convert the fixed costs for the capacity of a proxy combined cycle combustion turbine (CCCT) to a dollar-per-megawatt hour (MWh) rate based on the on-peak capacity factor (CF) of the CCCT. To determine the fixed costs of a CCCT that are for capacity, utilities use estimates of the fixed costs of a pure capacity resource, a single-cycle combustion turbine (SCCT)).[8]

After determining the amount of avoided capacity costs of a CCCT, the first step in designing the volumetric rate is to determine the number of hours that should be used to "spread" the costs. The utilities spread the avoided costs to a subset of on-peak hours, rather than all on-peak hours, because the proxy CCCT is not expected to be available in all on-peak hours. Accordingly, the utilities spread the avoided costs to the number of on-peak hours the proxy CCCT is expected to be available.

The utilities determine the appropriate number of hours to spread the avoided costs by multiplying the number of on-peak hours in a year by the on-peak CF of the proxy CCCT.[9] On-peak hours are defined by the North American Electric Reliability Corporation (NERC) as 6:00 a.m. to 10:00 p.m. Monday through Saturday, except certain holidays.[10] Approximately 57

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[7] *See* Order No. 05-584 at 26.

[8] *See* Order No. 05-584 at 26. This method was used for standard non-renewable avoided cost prices, which were the only standard avoided cost prices authorized until Order No. 11-505. In Order No. 11-505, the Commission authorized standard renewable avoided cost prices based on the next avoidable renewable resource in the utilities' IRPs. The utilities' compliance filings with standard renewable rates never became effective, however. In Order No. 14-058, the Commission authorized capacity contribution adjustments to standard non-renewable avoided cost prices obtained from the traditional method for determining avoided capacity costs.

[9] Staff/400, Andrus/4.

[10] Staff/300, Andrus/8.

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percent of the hours in a year are "on-peak" hours. [11] The exact number of annual on-peak hours varies slightly by year, depending on whether designated holidays fall on Sunday when there are already no peak hours and other factors. For purposes of this testimony, Staff will assume there are 4993 on-peak hours in a year.

The CF of a resource is the ratio of the MWh generated over a designated period of time to the product of the capacity of the resource and the number of hours in the designated period of time (e.g., 8,760 hours for an annual CF, 24 hours for a daily CF, etc.). The *on-peak* CF is the ratio of the MWh generated in the on-peak hours of a designated period to the product of the capacity of the resource and the number of on-peak hours in the designated period. There is more than one algebraic formula to determine the CF and on-peak CF of a generation resource. The determination of the proxy CCCT's on-peak CF is based on inputs from the utilities' IRPs.

Staff used 91.8 percent as the on-peak CF for the proxy CCCT in the example equations in its testimony. [12] Assuming the proxy CCCT has an on-peak CF of 91.8 percent and assuming there are 4993 on-peak hours in the year, the equation to determine the number of hours to use to spread the capacity costs of the proxy CCCT looks like this: [13]

91.8% x 4993 = 4586

[on-peak CF of CCCT x annual on-peak hours = CCCT adjusted on-peak hours]

Once the capacity costs of the CCCT and the CCCT adjusted on-peak hours are determined, the utilities then determine the volumetric rate (price) for capacity by dividing the total annual capacity costs of the CCCT per MW by the number of CCCT adjusted on-peak

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[11] See PAC/600, Duvall/2 ("On-peak hours are defined as 6 AM to 10 PM Monday through Saturday, excluding holidays, or 57 percent of hours in a year.")

[12] Staff/400, Andrus/8-9. The on-peak CF for the proxy resources used to calculate the adder would be based on inputs from the utilities' IRPs. (Staff/300, Andrus/13.)

[13] Staff/400, Andrus/8-9.

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hours. Using $140,320 as the estimated annual capacity costs of the proxy CCCT[14] and the CCCT adjusted on-peak hours from the equation above, the equation to determine the volumetric rate (price) is as follows:

$140,320 ÷ 4586 hours = $30.61 per hour

[annual capacity costs of CCCT ÷ CCCT adjusted on-peak hours = MWh price]

Under the traditional method, the MWh price for capacity obtained from this calculation, $30.61, is added to the on-peak energy price for all on-peak hours.

The discussion above shows that the design of the traditional volumetric rate for avoided capacity is specific to the operating characteristics of a CCCT. The utilities use the capacity costs of a CCCT to determine their annual avoided capacity costs and use the on-peak CF of the CCCT to determine the subset of on-peak hours to use to spread the CCCT's capacity costs. This means that when the utilities create the volumetric rate, they base the rate on the assumption the proxy resource will not be available to operate in all on-peak hours (e.g. because of scheduled maintenance, etc.). In other words, the rate is designed to recover 100 percent of the capacity costs of the CCCT in less than 100 percent of the on-peak hours.

If the utilities based the volumetric rate on the total number of annual on-peak hours, rather than a subset during which the resource is expected to be available, the rate could not as a practical matter flow through 100 percent of the capacity costs because resources generally are not available 100 percent of the time.

B. Staff's Proposed Method is based on the characteristics of a solar resource.

Staff's Proposed Method for determining the capacity contribution adder for solar QFs selecting standard renewable avoided cost prices uses the same rate design methodology used to design the traditional avoided cost price for capacity described above. But, Staff's Proposed Method uses the operating characteristics of a proxy solar resource to determine the incremental amount of capacity costs that are avoided and how those costs should be spread.

[14] Staff used this amount in its example equations in its testimony. (Staff/400, Andrus/8-9.)

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As with the Current Method, Staff's Proposed Method for the capacity contribution adder for solar QFs selecting standard renewable avoided cost prices is based on a proxy solar resource's incremental contribution to peak (CTP), relative to the avoided proxy renewable resource in the utility's IRP.[15] As PacifiCorp states in its testimony, the CTP "of a generating resource takes into account the time of the generation and how it contributes to system reliability."[16] There are multiple ways to determine the CTP of a resource, including the "Exceedance Method" and the Effective Load Carrying Capability (ELCC) Method.[17] Staff does not have a recommendation for a specific method to determine the CTP of a proxy solar resource. Instead, Staff has recommended using inputs from the utilities' IRPs.[18] The inputs for CTPs would be subject to review in the same manner as other inputs.

The proxy solar resource's incremental CTP represents the amount of additional capacity the solar resource would provide over the proxy wind farm. It is determined by subtracting the CTP of the proxy renewable resource in the utility's IRP from the CTP of the proxy solar resource.

The proxy solar resource PacifiCorp used to determine the CTP for its Phase I compliance filing has a CTP of 13.6 percent.[19] The proxy wind resource that is the basis of PacifiCorp's standard renewable avoided cost calculations has a CTP of 4.2 percent. Using these inputs, the equation to determine the solar resource's incremental CTP looks like this:

13.6% - 4.2% = 9.4%

[solar proxy CTP – renewable resource proxy CTP = incremental solar CTP]

[15] Aside from the capacity contribution adder, standard renewable avoided cost prices are based on the costs of the next avoidable renewable resource in the utility's IRP, which is currently a wind resource for both PGE and PacifiCorp.

[16] PAC/600, Duvall/4. *See also* Idaho Power/600, Youngblood/7 ("[CTP] is a measure of how much capacity a resource is provided on-peak when the Company needs it most.")

[17] See Obsidian/300, Brown/11.

[18] Staff/300, Andrus/13.

[19] See Obsidian/300, Brown/11.

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Once the incremental solar CTP is determined, the next step is to determine the incremental capacity costs that the solar resource allows the utility to avoid, over the avoided capacity costs for the proxy renewable resource. The incremental avoided capacity costs are determined by multiplying the incremental solar CTP by the annual CCCT capacity costs. Using the same annual CCCT capacity costs used in the examples above and 9.4 percent as the incremental solar CTP, the equation is as follows:

$140,320 x 9.4% = $13,190

[CCCT capacity cost x incremental solar CTP = incremental solar capacity cost][20]

Next, the number of hours over which the incremental capacity costs will be spread is determined as it was in the traditional method, except using the on-peak CF of the solar proxy rather than the on-peak CF of the proxy CCCT. Under Staff's Proposed Method, the on-peak CF of the proxy solar resource is based on inputs from the utilities' IRPs, and subject to review as are other inputs to avoided cost prices.[21]

For purposes of this brief, Staff will assume the on-peak CF of the proxy solar resource is 27.5 percent.[22] Using this input and 4993 as the number of annual on-peak hours, the equation to determine the number of hours to which to spread the incremental avoided capacity costs of the proxy solar resource is as follows:

27.5% x 4993 hours = 1373 hours[23]

[on-peak CF of solar resource x annual on-peak hours = solar adjusted on-peak hours]

Once the incremental amount of avoided capacity costs and the appropriate adjustment to on-peak hours are determined, the volumetric rate for the capacity contribution adder is

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[20] Staff/400, Andrus/8-9.

[21] Staff/400, Andrus/13.

[22] This is the percentage used in examples in Staff testimony. (Staff/400, Andrus/9.)

[23] Staff/400, Andrus/9.

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determined by dividing the incremental avoided capacity costs for the proxy solar resource by the number of solar adjusted on-peak hours. This volumetric rate shows how much should be charged during on-peak hours so that a solar QF operating consistently with the CF of proxy solar resource could recover the value of its capacity contribution. Using $13,190 as the incremental amount of avoided capacity costs for the solar proxy resource and 1353 as the number of solar adjusted on-peak hours, the equation to determine the volumetric rate for the capacity contribution adder for a solar QF is as follows:

$13,190 ÷ 1353 hours = $9.60 per MWh[24]

[incremental capacity costs for solar QF ÷ solar adjusted on-peak hours = MWh price]

As with the traditional method, the price per MWh for the solar QF capacity contribution adder is added to the avoided cost price for energy and paid to solar QFs for generation during on-peak hours.

Under Staff's Proposed Method, the incremental avoided capacity costs for a proxy solar resource are spread to a subset of hours so that the rate is designed to recover 100 percent of the incremental capacity costs in less than 100 percent of the on-peak hours, as is done in the

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[24] Staff/400, Andrus/9.

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traditional method. The following table shows the similarity of the two methods with a side-by-side comparison of the calculations in each:

Table 1: Calculation of Avoided Capacity Costs

Calculations to determine:	Traditional Method	Staff Proposed Method
Avoided capacity costs	Fixed costs of SCCT	Fixed costs of SCCT x incremental CTP of solar resource
Hours over which to spread avoided capacity costs (Adjusted Hours)	On-peak CF of proxy CCCT x annual # of on-peak hours	On-peak CF of proxy solar resource x annual # of on-peak hours
MWh price	Avoided capacity costs of CCCT ÷ CCCT Adjusted Hours	Incremental avoided capacity costs for solar resource ÷ Solar Adjusted Hours
Hours to which MWh price for capacity applies	All on-peak hours	All on-peak hours

III. Staff's Proposed Method does not pay solar QFs for capacity they do not provide.

The three utilities assert that Staff's Proposed Method is a departure from the Commission's long-standing policy of basing avoided cost prices on the characteristics of the proxy resource and that Staff's Proposed Method would result in paying solar QFs for capacity they do not provide.[25] Using characteristics of the QF resource type rather than those of the avoided proxy resource is a departure from the Commission's traditional avoided cost methodology, but one the Commission authorized in Order No. 14-058. And, as discussed below, Staff's Proposed Method does not result in paying solar QFs for capacity they do not provide.

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[25] *See e.g.,* PAC/700, Duvall/2, PGE/500, Macfarlane/4, Idaho Power/600, Youngblood/14-16.

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A. **Basing avoided cost prices on characteristics of the QF is authorized by the Commission and is consistent with PURPA.**

In Phase I, Staff proposed that the Commission depart from precedent and consider the capacity value that different QF resources bring to the utilities' systems when setting avoided cost prices. As the utilities point out in their testimony, the Commission's traditional method is based strictly on costs of the proxy resource. The point of Staff's Phase I recommendation was to more accurately match the utility's avoided cost prices to the value of each resource type's contribution to meeting the utility's peak load.

As explained above, Staff's Phase I proposal (now the "Current Method") for calculating the capacity contribution adder for solar QFs is flawed because the rate design used to determine the price for the incremental avoided capacity provided by the solar QF is still based on the characteristics of a CCCT. This flaw is addressed with Staff's Proposed Method in which both the incremental amount of avoided capacity costs attributable to a solar QF and the design of the rate to pay solar QFs are based on the characteristics of a proxy solar resource.[26]

Although the Current Method is a departure from the Commission's previous avoided cost methodology, it is consistent with the Public Utility Regulatory Policy Act (PURPA) and implementing regulations. Under 49 C.F.R. § 292.304, standard avoided cost prices can vary by resource type.

In its order adopting rules to implement PURPA, FERC noted that characteristics of the QF may impact standard avoided cost rates:

> [49 C.F.R. §292.304(3)(vi)] provides that rates for purchase shall take into account "the individual and aggregate value of energy and capacity from qualifying facilities on the electric utility's system . . ." * * * To the extent that

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[26] Staff does not, as PGE asserts, recommend a capacity adder rate that is specific to each solar QF. *See* PGE/500, Macfarlane/3-4. The inputs for the capacity contribution adder are based on inputs from a proxy solar resource in the utility's IRP.

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> this aggregate capacity value can be reasonably estimated, it must be reflected in standard rates for purchases.[27]

In the same order, FERC used contributions to meeting peak summer loads by solar QFs as an example of when a state may incorporate the value of the generation from the QF into avoided cost rates.

> Some technologies, such as photovoltaic cells, although subject to some uncertainty in power output, have the general advantage of providing their maximum power coincident with the system peak when used on a summer peaking system. The value of such power is greater to the utility than power delivered during off-peak periods. Since the need for capacity is based, in part, on system peaks, the qualifying facility's coincidence with the system peak should be reflected in the allowance of some capacity value and an energy component that reflects the avoided energy costs at the time of the peak.[28]

Staff's Proposed Method is consistent with FERC's observations regarding the potential value of capacity provided by solar QFs during on-peak hours. As Idaho Power notes in its testimony, "[c]apacity contribution is a measure of how much capacity of a resource is provided on-peak, when the Company needs it the most."[29] Staff's Proposed Method for calculating the capacity contribution adder for solar QFs allows solar QFs to receive capacity payments that are commensurate with the value of their contributions to meeting the utility's peak load.

B. Solar QFs will not be paid for capacity they do not provide under Staff's Proposed Method.

The utilities are incorrect that Staff's Proposed Method would result in utilities paying solar QFs more than the utilities' avoided capacity costs.[30] Staff's testimony includes examples of what a solar QF resource could expect to be paid for capacity under the avoided cost price

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[27] *Final Rule Regarding the Implementation of Section 210 of the Public Utility Regulatory Policies Act of 1978*, Order No. 69, FERC Stats. & Regs. ¶ 30,128 (45 Fed. Reg. 12,214, 12,224) (Feb. 25, 1980).

[28] *Id.*, 45 Fed. Reg. at 12225.

[29] Idaho Power/600, Youngblood/7. *See also* PacifiCorp/600, Duvall/4.

[30] Pac/600, Duvall/8.

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method used prior to adoption of standard renewable avoided cost prices in Order No. 11-505 ("the Previous Method),[31] the Current Method (adopted in Order No. 14-058), and Staff's Proposed Method, when the CTP for solar resources in the utility's Integrated Resource Plan is 13.6 percent, the CTP for the proxy wind resource is 4.2 percent, the on-peak capacity factor of the proxy CCCT is 91.8 percent, and the utility's estimated avoided annual capacity costs are approximately $140,000 per MW.

Under the Previous Method, a solar QF could receive a percentage of the total avoidable capacity costs roughly equal to that QF's capacity factor. Assuming the individual QF resource had a capacity factor of 27.5 percent, the solar QF could expect capacity payments equal to approximately 30 percent of the fixed costs of a SCCT, $42,000 per year per MW.[32]

Under the Current Method, a solar QF could receive just under $4,000 annually for capacity – less than three percent of the utility's estimated costs for capacity.[33]

Finally, under Staff's Proposed Method, when the solar QF proxy has an incremental CTP of 9.4 percent, the solar QF could expect to receive an adder to its on-peak rate that is roughly equal to 9.4 percent of the avoided capacity costs of the CCCT.[34]

These comparisons show that the utilities' assertion that Staff's Proposed Method would result in payments for costs that are not avoided is incorrect. The proxy solar resource in PacifiCorp's IRP is forecasted to provide PacifiCorp approximately 13.6 percent of the capacity a CCCT could provide over the course of a year. Of that 13.6 percent, 9.4 percent is incremental to the forecasted capacity provided by the proxy wind resource that is the basis for PacifiCorp's standard renewable avoided cost prices. Under Staff's Proposed Method, a solar QF could receive added capacity payments roughly equal to 9.4 percent of the capacity costs of the CCCT.

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[31] This investigation interrupted the review of the utilities' filings submitted in compliance with Order No. 11-505, and so the methodology adopted in that order has never become effective.

[32] Staff/400, Andrus/5.

[33] Staff/400, Andrus/5.

[34] Staff/400, Andrus/5.

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Contrary to PacifiCorp's assertion, the Staff Proposed Method does not guarantee that a solar QF will receive a "set dollar amount for capacity over the course of the year regardless of how many hours it generates during on-peak hours."[35] How much a solar QF actually receives will depend on the number of on-peak MW hours it generates.

IV. Conclusion.

Staff recommends that the Commission adopt Staff's Proposed Method for calculating the capacity contribution adder for solar QFs selecting standard renewable avoided cost prices.

DATED this 18th day of December 2014.

Respectfully submitted,

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Of Attorneys for Staff of the Public Utility Commission of Oregon

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[35] PAC/700, Duvall/2.

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CERTIFICATE OF SERVICE

I hereby certify that on December 18, 2014, I served the foregoing STAFF BRIEF document upon all parties of record in this proceeding by electronic mail only as all parties have waived paper service.

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