



Portland General Electric
121 SW Salmon Street · Portland, Ore. 97204
PortlandGeneral.com

April 20, 2018

Email
Puc.filingcenter@state.or.us

Filing Center
Public Utility Commission of Oregon
201 High Street, SE Ste. 100
Salem, OR 97301

RE: UM 1912- Portland General Electric Resource Value of Solar Reply testimony

Attention Filing Center:

Per the Schedule listed for Docket No. UM 1912, Portland General Electric hereby submits its Reply Testimony.

If you have any questions, please contact Todd McConachie at 503-464-7012. Please direct all formal correspondence and requests to the following email address:
pge.opuc.filings@pgn.com.

Sincerely,

A handwritten signature in blue ink that reads "Robert Macfarlane". The signature is written in a cursive, flowing style.

Robert Macfarlane
Interim Manager, Pricing and Tariffs
RM: tm

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I Introduction and Summary

1 **Q. Please State your name(s) and position with Portland General Electric (“PGE”)**

2

3 A. My name is Jacob Goodspeed. I am a senior analyst in Pricing and Tariffs for PGE. My
4 qualifications appear in the original testimony for the Resource Value of Solar in section
5 PGE/100. My name is Tess Jordan. I am a senior analyst in Financial Forecasting and
6 Economic Analysis for PGE. My qualifications appear in the original testimony for the
7 Resource Value of Solar in section PGE/200. My name is Brett Sims. My position at PGE
8 is Director of Strategy Integration and Planning My qualifications appear in the original
9 testimony for the Resource Value of Solar in section PGE/300. My name is Darren
10 Murtaugh. I am the Manager of Transmission and Distribution (T&D) Planning and
11 Project Management at PGE. My qualifications appear in the original testimony for the
12 Resource Value of Solar in section PGE/400.

13 **Q. What is the purpose of your testimony?**

14 A. Our testimony is in response to the testimony of Commission Staff (Ms. Andrus) as well
15 as the witness from Renewable Northwest (RNW), Mr. Michael O’Brien, and the
16 testimony of the witness, Mr. R. Thomas Beach, representing Oregon Solar Energy
17 Industries Association (OSEIA) in Docket No. UM 1912. Docket No. UM 1912 has been
18 established to determine the methodologies and processes to determine the Resource
19 Value of Solar (RVOS) that PGE will calculate annually going forward. Our testimony
20 will articulate the Company’s response to the criticisms leveled against PGE’s methods by

1 Staff and the other witnesses as well as offer further clarification related to PGE's
2 proposed calculations to determine its RVOS going forward.

3 **Q. Please provide background and context for your testimony.**

4 A. The UM 1912 Docket was opened in December of 2017 in response to Order No. 17-357
5 of Docket No. UM 1716. Order No. 17-357 largely adopted the RVOS methodology
6 proposed by Energy + Environmental Economics (E3) to produce a 25-year marginal,
7 levelized value for a generic small-scale solar resource installed in 2017. Order No. 17-
8 357 also began Phase II of the RVOS process by establishing individual dockets for each
9 utility (PGE, PacifiCorp and Idaho Power), to engage in developing their own RVOS rates
10 and directed each utility to establish a utility specific RVOS rate. Docket No. UM 1912
11 outlines the specific attributes of PGE's calculations and methodologies used to create
12 PGE's RVOS rate.

13 **Q. How is your testimony organized?**

14 A. We will first address the suggestions and criticisms of PGE's 12/4/2017 testimony made
15 by Commission Staff. After which, we will then take a look at the suggestions and
16 criticisms made by RNW's Michael O'Brien and finally, comment on the testimony
17 submitted by Dr. R. Thomas Beach on behalf of OSEIA.

18 **Q. Can you please summarize your testimony as it relates to the criticisms directed**
19 **against PGE's methodologies and calculations related to the RVOS rate PGE**
20 **developed?**

21 A. Yes, please see below:

- 1 • Staff was critical of PGE’s treatment of hydro variability averaging in the energy
- 2 component of RVOS and requested that we develop separate variable integration
- 3 costs for renewable wind and solar resources we model.
- 4 • Mr. O'Brien from RNW is recommending that we add additional value to the
- 5 capacity component during the utility’s sufficiency periods.
- 6 • PGE takes exception to the methodologies employed by Mr. Beach in OSEIA’s
- 7 reply testimony.

II Response to OPUC Commission's Staff Comments

1 **Q: Can you give a general overview of Staff's evaluation of the eleven elements of**
2 **RVOS that PGE presented in direct testimony filed on December, 4, 2017?**

3 A. Yes. Overall, Staff's feedback was constructive and supportive of the work done by PGE
4 to develop RVOS. Of the eleven elements, Staff only had critical feedback on two issues;
5 the hydro variability calculation in the energy component of RVOS, and requesting that
6 PGE break out solar and wind as separate components of renewable integration costs. For
7 the other nine elements, Staff was generally supportive of PGE's calculations and
8 methods.

9 **Q: Can you describe how PGE approaches modeling for hydro variability in the energy**
10 **component of the RVOS pricing model?**

11 A. In valuing energy, PGE modeled hydro variability consistent with its IRP. For PGE
12 resources, PGE used the average generation across a 79-year hydro study to determine the
13 simple average annual hydro conditions to be used to forecast hydro conditions going
14 forward. For non-PGE hydro resources, the variability within the Western Energy
15 Coordinating Council is based on an average of U.S. Energy Information Administration
16 (EIA) data that covers 12 years of hydro conditions. PGE used the AURORAxmp model
17 to develop energy prices given these and many other inputs. PGE did not utilize
18 additional sampling techniques, or the creation of confidence intervals around the
19 unweighted average.

20 **Q. How does Staff interpret the requirement that average energy price be represented**
21 **under PGE's hydro conditions assumptions?**

1 A. Staff asserts in its testimony that “in the Pacific Northwest hydro conditions are a
2 fundamental market driver”¹ of the value of energy. Staff also states that, “there are
3 complex interactions between hydro conditions and market prices. In order to capture the
4 complex relationships, market price should be calculated separately under random
5 sampling of hydro conditions.”² Staff also contends that with a random sample of hydro
6 conditions, the average of the resulting market prices should provide an approximation of
7 average market price under the entire distribution of hydro conditions.

8 **Q. Does PGE agree with Staff regarding this interpretation?**

9 A. Not entirely. PGE agrees with Staff that Pacific Northwest hydro conditions are one of
10 many key drivers that determine the value of energy in the Pacific Northwest. However,
11 PGE finds that Staff’s proposal is not supported as providing improved accuracy of
12 pricing and is not consistent with the methodology used in other dockets.

13 **Q: What reasons does PGE have to support using the simple average to model hydro**
14 **variability?**

15 A. PGE does not agree that a random sampling of hydro conditions would produce a more
16 meaningful approximation of the average energy price than using PGE’s proposal. PGE
17 finds that:

18 Staff did not provide data supporting the claim that their proposal improved the accuracy
19 of the pricing. Further, PGE notes that there are many elements that contribute to the
20 forecast of energy prices, some of which are correlated. Simply sampling hydro
21 conditions while holding other inputs frozen (regardless of their relationship to hydro

¹ Staff Exhibit 100/Andrus /13

² Ibid

1 conditions) may serve to produce a less meaningful approximation of average energy
2 prices. PGE notes that other key inputs to the AURORAxmp model assume average
3 conditions.

4 Staff's proposal for the treatment of hydro in developing average energy prices for RVOS
5 differs from the treatment in other dockets such as the IRP and avoided cost. PGE
6 proposes that the methodology of examining hydro conditions when developing energy
7 prices should align with those already employed in the IRP and avoided cost.

8 For these reasons, PGE recommends that Staff's proposal not be adopted.

9 **Q. In its reply testimony, OPUC Commission Staff was also critical that the variable**
10 **integration costs that PGE included in the RVOS model. Can you please address why**
11 **PGE used these costs?**

12 A. Yes. PGE used the integration costs found in the Company's most recently acknowledged
13 IRP. The Variable Energy Resource (VER) study produced a combined wind and solar
14 integration cost of \$0.87/MWh (2018\$). As the most recently completed study, this was
15 determined to be the best information available.

16 **Q. Staff believes PGE should develop a method for allocating VER integration costs to**
17 **specific variable resource types. Will PGE be developing VER integration costs**
18 **capable of modeling only solar resources in the near future?**

19 A. Yes. PGE is currently developing an integration cost study that will address both
20 incremental solar and incremental wind resources separately. PGE intends to include this
21 study in the 2019 IRP

III Response to Renewable Northwest's Comments

1 **Q. Did the witness for RNW take exception to PGE's methodology for any of the ten**
2 **elements that were presented in PGE's RVOS testimony?**

3 A. Yes, Mr. Obrien (RNW/100, O'Brien/8) disagreed with PGE's modeling decision to assign
4 no value to capacity during the sufficiency period stating "As I testified in UM 1716, a
5 capacity value of zero would undervalue the RVOS during the sufficiency period because
6 solar systems provide a 'Generation Capacity' benefit even in years when they may not
7 help displace the procurement of a capacity resource.³"

8 **Q. Did the Commission provide specific instructions regarding how to calculate the**
9 **avoided cost of capacity during the sufficiency period?**

10 A. Yes. In Order No. 17-357, the Commission directed the utilities to provide "capacity value
11 and timing (deficiency date) in line with their current approved standard nonrenewable
12 Qualified Facilities (QF), Schedule 201 avoided cost capacity value."⁴

13 For PGE's Tariffed Schedule 201 "Standard Non-Renewable Avoided Cost" rates, the
14 Commission determined that PGE's sufficiency period for capacity resources extends
15 through 2020. Given this, no value was assigned to capacity as outlined in the current
16 approved standard.

³ UM 1912 RNW/100, O'Brien/8, 3/16/2018

⁴ Order No. 17-357, pg. 6

1 **IV. OSEIA’s Comments and testimony related to Oregon’s RVOS rate.**

2 **Q. Do you have any comments on the testimony and recommendations that Mr.**

3 **Beach made on behalf of OSEIA?**

4 A. Yes. The OSEIA testimony recommends real levelized RVOS values in Table ES-15 that
5 are twice the values that the utilities derived individually. It appears that Mr. Beach
6 arrives at these inflated calculations for RVOS by applying a single utility’s value to the
7 other utilities, regardless of applicability. He employs methodologies that utilities do not
8 employ, and that are not considered best practice, such as calculating the hedge value of
9 avoided fuel costs for a gas turbine for a full 25-year period to estimate the avoided hedge
10 value of solar.

11 **Q. How did Mr. Beach arrive at such high values for RVOS?**

12 A. Depending on the factor, it appears that Mr. Beach used either the highest individual
13 factor amount that a utility used to calculate its own RVOS or brought additional
14 elements into the calculation that would increase the factor’s value. It appears he did not
15 take into consideration the unique aspects of each utility. Below is a list of each RVOS
16 factor and how OSEIA inflated each value.

- 17 • **Avoided Energy:** OSEIA picked PAC’s approach, which shapes hourly prices using
18 the regional Energy Imbalance Market. This does not make sense for PGE due to two
19 distinct reasons; 1) PGE does not use the EIM for large amounts of energy trades, and
20 2) PGE typically uses EIM trades for shorter-term imbalance issues (primarily 5 and

⁵ UM 1912 OSEIA/100, Beach / pg. i

- 1 15-minute markets). EIM does not accurately represent PGE's hourly energy avoided
2 costs.
- 3 • Generation Capacity: OSEIA advanced the resource balance year by four years prior
4 to when each of the IOU's will need capacity. This modification over-compensates for
5 the distributed generation asset's capacity contribution, and does not adhere to Order
6 No. 17-357, as discussed above.
 - 7 • Avoided T&D: OSEIA chose to adopt PGE's methodology, without exploring why
8 IPC and PAC developed different methods, and applied it across all three utilities
9 because it, again, created the highest value of RVOS.
 - 10 • Avoided Line Losses: OSEIA used marginal line losses as opposed to average line
11 loss factors for all of the utilities. To compensate for the difference in methodology,
12 Mr. Beach increased the line loss factor by 50%. We find this adjustment unreasonable
13 and unjustified. There is no calculation to support a 50% line loss adjustment as it
14 relates to PGE.
 - 15 • Administration Charges: Without considering that each utility has a different way of
16 allocating administration charges, OSEIA used PAC's administration factor as it was
17 the smallest of the three (\$2.30). This is less than half of what PGE calculated (\$5.58)
18 and does not consider that system costs are unique to each utility. Again, the OSEIA
19 method simply applies these lower costs to all three utilities which is inappropriate and
20 arbitrary.
 - 21 • Integration: Mr. Beach accepted the IOU's integration charges so we do not have a
22 comment on this.

- 1 • Market Price Response: OSEIA accepts PGE’s calculations for this factor and applies
2 it to all of the utilities, even though we are all operating with different amounts of solar
3 penetration and have different capacity factors in our respective market areas. OSEIA
4 cites that the PGE benefit amount is close to the MPR in the New England
5 Independent System Operators Market. Although we accept that the value that we use
6 is acceptable to OSEIA, we do not agree that it is appropriate to use the market price
7 response values of PGE in PAC or Idaho’s markets.
- 8 • Hedge Value: The factor that the utilities were told to use by the OPUC was a 5%
9 factor. OSEIA used a hedging value that was developed for the Maine Public Utilities
10 Commission that hedged a natural gas turbine for a full 25 years of operation. The
11 hedge was not for a more typical one or four-year term. A 25-year term has a very
12 large risk premium associated with it, as not many traders take a 25-year position on a
13 standard commodity hedge. Because of this non-standard approach, the hedge value is
14 exaggerated.
- 15 • Environmental Compliance: Again, without concern for the different state
16 environmental laws or potential rules faced by the three IOU’s operating in different
17 states, OSEIA took the highest value for environmental compliance and applied it to
18 all three utilities.

19 **Q. Does this conclude your testimony?**

20 A. Yes.