

BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

In the Matter of the Investigation of the Costs)	Docket No. 14-035-114
and Benefits of PacifiCorp's Net Metering)	
Program)	DPU Exhibit 1.0SR

Surrebuttal Testimony of

Artie Powell, Ph.D.

Division of Public Utilities

August 8, 2017

1 NEM SURREBUTTAL TESTIMONY

2 **Q: PLEASE STATE YOUR NAME, EMPLOYER, TITLE, AND BUSINESS ADDRESS FOR THE**
3 **RECORD.**

4 A: My name is Artie Powell. I am employed by the State of Utah and work in the Division
5 of Public Utilities (Division). I am the manager of the energy section. My business
6 address is 160 East 300 South, Salt Lake City, Utah.

7 **Q: HAVE YOU PREVIOUSLY FILED TESTIMONY IN THIS DOCKET?**

8 A: Yes. On behalf of the Division of Public Utilities (Division), I filed direct testimony on
9 June 8, 2017 and rebuttal testimony on July 25, 2017.

10 **Q: WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY?**

11 A: I address several statistical issues raised in rebuttal testimony by other parties, notably
12 Dr. Richard Collins on behalf of Vivint Solar, and the use of the IRP as a tool to value
13 distributed generation. I will also update and summarize the Joint Proposal offered by
14 the Division and the Office of Consumer Services (Office) in rebuttal testimony.

15 Ms. Myunghee Tuttle and Mr. Stan Faryniarz also provide surrebuttal testimony for the
16 Division. Ms. Tuttle will address the Company's latest proposed customer charge and
17 recommends that the construction of rates for NEM and non-NEM customers alike be
18 addressed in the Company's next General Rate Case (GRC). Mr. Faryniarz will address
19 separating NEM customers into a separate class, the Company's proposed rate design
20 and customer charge, and the use of gradualism.

21 There was a considerable amount of rebuttal testimony filed by the intervening parties
22 in this docket. The Division has not attempted to address every claim, issue, or proposal
23 that the parties have offered. Rather, the Division has limited its surrebuttal testimony
24 to the major issues. Silence, therefore, on any issue should not be interpreted as either
25 agreement or disagreement with another party.

26 **Q: WILL YOU SUMMARIZE YOUR SURREBUTTAL TESTIMONY?**

27 A: Several parties raise questions about the adequacy of the Company's samples and its
28 techniques. These questions are without merit. Based on the Company's sampling
29 design and common statistical techniques, I conclude that the Company's samples are
30 adequate and procedures are appropriately designed.

31 Other parties also argue that IRP sensitivity runs show a value for distributed
32 generation. These arguments are similar to those presented in earlier phases of this
33 docket. The Commission concluded the use of IRP projections was neither necessary to
34 accomplish the task at hand nor was it intended by the Legislature. I conclude that the
35 Commission's prior decision in this matter is sound.

36 Finally, the Office and the Division proposed in rebuttal a Joint Proposal to address
37 closure of the current NEM program and a transition path for future development of a
38 new program for distributed generation customers. I will provide a summary of the
39 Joint Proposal later in my surrebuttal testimony.

40 **Q: DR. COLLINS ASSERTS THAT “FROM A STATISTICAL PERSPECTIVE, THE RMP LOAD**
41 **STUDY LACKS THE REQUISITE NUMBER OF OBSERVATIONS ON WHICH TO MAKE**
42 **RELIABLE STATISTICAL INFERENCE ON THE POPULATION AS A WHOLE”¹ AND THAT**
43 **“UNFORTUNATELY, THE DIVISION DID NOT ADDRESS OR ANALYZE THE STATISTICAL**
44 **SIGNIFICANCE OF THE LOAD OR PRODUCTION PROFILE STUDIES.”² DO YOU AGREE**
45 **WITH DR. COLLIN’S ASSERTIONS?**

46 **A:** No, both of Dr. Collin’s assertions are incorrect. As a bit of background, I earned a
47 doctorate degree in economics from Texas A&M University. Prior to joining the Division,
48 I taught courses in economics, regression analysis, and statistics for both undergraduate
49 and graduate students.

50 First, the Division is well aware of the criteria or standards that the Company uses to
51 construct samples for its load research studies. In addition to randomly selecting
52 participants for its studies, the Company’s witness Mr. Meredith explains,

53 The Company adheres to generally accepted sampling procedures used
54 throughout the industry. A confidence level of 90 percent and precision of plus
55 or minus 10 percent is generally accepted as a minimum standard. The
56 Company’s residential net metering sample was designed at the 95 percent
57 confidence level with plus or minus 10 percent precision. Additional sample sites
58 were added to enhance the study and properly deal with population growth and
59 unexpected data problems.^{3,4}

¹ Dr. Richard Collins, Rebuttal Testimony, July 25, 2017, lines 74-76.

² Dr. Collins, lines 268-269.

³ Mr. Robert M. Meredith, Rebuttal Testimony, July 25, 2017, lines 246-251.

⁴ Using a 95 percent rather than a 90 percent confidence level, reduces the probability of a Type I Error from 10 percent to five percent. A Type I Error occurs when the sample leads to incorrectly rejecting a true null hypothesis.

60 Second, along with the size of the population from which the sample data are drawn,
61 these criteria will determine the sample size necessary to, in Dr. Collins' words, "make
62 reliable statistical inference." Again, Mr. Meredith explains,

63 To achieve a 95 percent confidence level with plus or minus 10 percent
64 precision, the Company's sampling procedures indicated that 45 sites would be
65 required. The Company's load research study exceeded this level by relying upon
66 52 sites."⁵

67 Third, the Company uses a stratification scheme to further insure that its sampling will
68 lead to valid statistical inferences. Generally, stratification allows a smaller sample than
69 otherwise would be necessary to achieve a given level of precision.

70 Finally, despite the fact that formulas (based on the specified criteria and population
71 size) for the necessary sample size are common in most texts on statistics, Dr. Collins
72 provides no empirical evidence that the Company's sample sizes are inadequate.

73 The Division believes the Company's sampling practices are sound and the sample sizes
74 for the load research study are adequate to achieve the specified level of precision.

75 **Q: RESPONDING TO DR. DERAMUS, MR. MEREDITH INDICATES THAT, WHILE THE**
76 **OVERALL POPULATION SIZE IS A FACTOR IN DETERMINING THE APPROPRIATE SAMPLE**

In the present case, as long as the sample was randomly drawn from the underlying population, the choice of the higher confidence level makes it more likely that the sample is representative of that population. Also, the higher confidence level increases the required sample size.

⁵ Mr. Meredith, lines 251-254.

77 **SIZE, THE VARIANCE OF THE POPULATION HAS A GREATER INFLUENCE.⁶ DO YOU**
78 **AGREE?**

79 A: Yes, Mr. Meredith is correct. In general, the sample size (n) will be proportional to the
80 product of the variance of the population (σ^2) and the ratio of the population size (N)
81 and one less than the population size (N - 1):

82
$$n \propto \sigma^2 * \left(\frac{N}{N - 1} \right)$$

83 For relatively large populations, the last term on the right will be close to one and,
84 therefore, will have little effect on the required sample size as the population size
85 changes. However, changes in the variance will have a relatively large effect on the
86 necessary sample size. For an illustration, consider the hypothetical example depicted
87 in Table 1.⁷

88 For a constant variance, $\sigma^2 = 0.1225$, if the population size increases from 1,000 to
89 10,000 and then to 20,000, an increase of 900 percent and 100 percent respectively, the
90 required sample size only increases correspondingly by 4.13 percent and 0.23 percent.
91 However, if the population size is held constant and the variance is doubled, the
92 required sample size increases by approximately 88 percent.

⁶ Mr. Meredith, lines 285-287.

⁷ This example assumes the Company's sampling standard of a 95 percent confidence level with 10 percent precision. The population variance is assumed to be $\sigma^2 = 0.1225$. For a population size of N = 1,000, the required sample size is approximately n = 45.

93 Table 1: Required Sample Sizes

Change in Sample Size as N Changes (Constant Variance)			
N	n	% Change in N	% Change in n
1,000	44.99		
10,000	46.84	900%	4.13%
20,000	46.95	100%	0.23%

Change in Sample Size as Variance Changes (Constant Population Size)			
N	Variance	n	% Change in n
1,000	0.1225	44.99	
1,000	0.2450	84.52	88%

94

95 **Q: DR. COLLINS STATES, “IF ONE CANNOT CONCLUDE, WITH SOME STATISTICAL SURETY,**
96 **THAT THE SAMPLE DATA REPRESENTS THE ACTUAL POPULATION, THEN ONE CANNOT**
97 **DRAW CONCLUSIONS USING THAT DATA.” WOULD YOU AGREE WITH DR. COLLINS’**
98 **IMPLIED CLAIM THAT THE COMPANY’S DATA DOES NOT REPRESENT THE “ACTUAL**
99 **POPULATION” AND, THEREFORE, NO VALID INFERENCES CAN BE DRAWN FROM THE**
100 **COMPANY’S DATA?**

101 **A:** No, I do not agree with Dr. Collins’ implied claim. While I am not sure what Dr. Collins
102 means by “statistical surety”—one can never prove anything with statistics—he has not
103 provided any evidence that the Company’s data is not adequate or representative. For
104 example, his unsupported claims about inadequate sample sizes, as I previously
105 discussed, are misplaced. The Company also followed standard procedures in collecting

106 the data: sample sizes were based on the specified criteria and common formulas, and
107 data was collected in a random fashion. Furthermore, the Company favorably bench
108 marked its data using PVWatts®.⁸

109 Neither Dr. Collins nor Dr. DeRamus provide convincing evidence to support their claims
110 that the sample sizes are inadequate or were constructed inappropriately, or that the
111 data is not representative of the NEM population.

112 **Q: REFERRING TO THE COMPANY’S 2015 AND 2017 INTEGRATED RESOURCE PLANS, DR.**
113 **COLLINS CLAIMS THERE IS “UNREFUTED EVIDENCE ON THE RECORD” THAT THE NEM**
114 **PROGRAM WILL LEAD TO FUTURE BENEFITS.⁹ DO YOU AGREE WITH DR. COLLINS THAT**
115 **THIS EVIDENCE IS UNREFUTED?**

116 **A:** No, I do not. It seems somewhat premature in rebuttal testimony, with more rounds of
117 testimony and an evidentiary hearing pending, to make a claim that any evidence is
118 unrefuted. Also, the claim is simply incorrect.

119 First, the Division responded to similar claims supporting the use of the IRP to establish
120 rates by intervening parties in earlier phases of this docket. In earlier surrebuttal
121 testimony, the Division argued,

122 The methods and outcomes of the IRP have little to do with the overall
123 prosecution of a rate case. Similarly, the proposed framework of the Joint Parties
124 will have little value in determining reasonable rates. The Division's proposal, on

⁸ Robert M, Meredith, Direct Testimony, Docket No 14-035-114, November 9, 2016, lines 197-224.

⁹ Dr. Collins, Rebuttal Testimony, Docket No. 14-035-114, July 25, 2017, lines 42-50.

125 the other hand, as well as those of the Office and the Company, lends itself to
126 just such an exercise. . . .

127 [T]he long-term analysis of the IRP has little to do with the rate case beyond a
128 prudence review. The present value revenue requirement of a preferred
129 portfolio from the IRP does not inform the jurisdictional revenue requirement or
130 the class rate spread. The long-term analysis proposed by the Joint Parties will
131 not inform rate spread or design. The Division's cost of service proposal will, on
132 the other hand, inform rates.¹⁰

133 Second, in his current rebuttal testimony for the Company, Mr. Meredith addresses the
134 IRP issue in response to Dr. Collins' direct testimony: "A determination of the costs and
135 benefits of NEM should not rely upon the difference between a pair of IRP sensitivity
136 runs, **because they include benefits that are anticipated many years into the future.**"¹¹

137 Third, Mr. Meredith's critique mirrors the Commission's order on similar claims to use
138 the IRP to value NEM in earlier phases of this docket:

139 We understand PacifiCorp forecasts distributed generation penetration in
140 connection with preparing its integrated resource plan ("IRP"). PacifiCorp's IRP
141 provides its regulators with information concerning how PacifiCorp intends to
142 meet its obligations to its customers over the next two decades. By necessity,
143 this process requires long-term forecasting of loads and the effect distributed
144 generation and other energy sector developments may have on PacifiCorp's
145 system. However, the Legislature has tasked us with evaluating the costs and

¹⁰ Artie Powell, Surrebuttal Testimony, Docket No. 14-035-114, September 29, 2015, lines 44-49. The broader response to the use of the IRP in valuing NEM is in lines 28-49, 92-133.

¹¹ Mr. Meredith, lines 357-359, emphasis added. Mr. Meredith's full response is found in lines 340-363.

146 benefits of net metering under Subsection One for the express purpose of
147 determining “a just and reasonable charge, credit, or ratemaking structure”
148 under Subsection Two. **Projecting the existence or quantity of distributed**
149 **generation ten or twenty years from now is not necessary for these purposes**
150 **and we do not believe the Legislature intended us to do so.**

151 Therefore, we adopt the Division’s, PacifiCorp’s and the Office’s
152 recommendation to assess net metering impacts over the test period utilized in
153 PacifiCorp’s next general rate case and decline to adopt the Joint Parties’
154 proposal.¹²

155 Again, to say that the IRP results for distributed generation are unrefuted is not correct.

156 **Q: DO YOU HAVE ANY FINAL COMMENTS REGARDING DR. COLLINS’ CLAIM FOR THE IRP**
157 **VALUE OF DISTRIBUTED GENERATION?**

158 Yes. Since the Division is reviewing the 2017 IRP according to the Commission’s
159 schedule, I will focus my remarks on the 2015 IRP.

160 In general, I agree with Mr. Meredith’s assessment that the 2015 IRP (or for that matter
161 any IRP) is not a reliable source to determine either long-term NEM benefits of
162 distributed generation or appropriate costs recovery. As I previously stated, the
163 methods and outcomes of the IRP have little to do with the overall prosecution of a rate
164 case.

¹² Order, Docket No. 14-035-114, November 10, 2017, p. 15, emphasis added.

165 Furthermore, I find Dr. Collins’ comparison of IRP runs irrelevant since his comparison is
166 between a sensitivity run with high levels of distributed generation penetration (S-05) to
167 a core case (CO5-1) that is not the preferred portfolio. Dr. Collins’ finding of \$706
168 million in DG benefits is based on the stochastic mean PVRR from the **base** price
169 scenario for S-05 benchmarked to the core case C-05 (see Table 2).¹³

170 *Table 2: 2015 IRP, Core Case CO5-1 Versus High Distributed Generation Case S-05*

From Table L.1 & L.2, Stochastic Mean PVRR(\$M) by Price Scenario

	Low	Base	High
CO5-1	\$26,220	\$27,900	\$29,778
S-05	\$25,628	\$27,194	\$28,972
Difference	\$592	\$706	\$806

171
172 If we compare S-05 to the preferred portfolio, Case C05a-3Q, we get a much lower
173 result, \$306 (see Table 3).

174

175

176

¹³ 2015 IRP, Volume II, p. 216-217.

177 *Table 3: 2015 IRP, Preferred Portfolio Versus High Distributed Generation Case S-05*

From Table L.1 & L.2, Stochastic Mean PVRR(\$M) by Price Scenario

	Low	Base	High
C05a-3Q Preferred Portfolio	\$26,090	\$27,500	\$29,086
S-05	\$25,628	\$27,194	\$28,972
Difference	\$462	\$306	\$114

178

179 Even this more relevant comparison, however, is problematic. The higher penetration
180 level of S-05 is not simply a matter of “adding” more distributed generation to the
181 system than that already embedded in the preferred portfolio. Rather, the higher
182 penetration level results from adopting several aggressive assumptions:

183 Two distributed penetration sensitivities are analyzed. As compared to base
184 penetration levels that incorporated annual reductions in technology costs, the
185 low distributed generation sensitivity reflects reduced reductions in technology
186 costs, reduced technology performance levels, and lower retail electricity rates.
187 In contrast, the high distributed generation sensitivity reflects **more aggressive**
188 **technology cost reduction assumptions, higher technology performance levels,**
189 **and higher retail electricity rates.**¹⁴

190 In order to adopt Dr. Collins’ assertions of an enhanced IRP value for distributed
191 generation, not only would the Commission have to accept forecasts of levels for
192 distributed generation ten or twenty years into the future, an exercise the Commission

¹⁴ 2015 IRP, Volume 1, p. 151, emphasis added.

193 has previously concluded is unnecessary for the purpose of the cost benefit analysis at
194 hand, it would also have to accept speculative assumptions beyond those already
195 assumed in the preferred portfolio, namely, (1) more aggressive technological cost
196 reductions; (2) higher technology performance levels; and (3) higher retail electric rates.

197 Given Dr. Collins has not provided any supporting evidence for the more aggressive
198 assumptions, and does not provide new arguments supporting the use of the IRP as a
199 valuation tool, the Commission should reject his recommendations. The Commission's
200 prior decisions and conclusions concerning the use of the IRP in this docket are sound.

201 **Q: DR. COLLINS STATES, "NO TEXTBOOK OR ACADEMIC ECONOMIST WOULD APPROVE**
202 **OF A ONE YEAR TEST PERIOD ANALYSIS OF COSTS AND BENEFITS FOR A PROJECT OR**
203 **INVESTMENT, WHERE THE IMPACTS CLEARLY EXTEND OVER MULTIPLE YEARS."¹⁵ DO**
204 **YOU AGREE?**

205 A: Not having read every text book on the subject nor talked with every academic
206 economist, I can neither agree nor disagree with this claim. I simply find it an
207 unconvincing irrelevant argument. After accepting extensive evidence on an
208 appropriate cost benefit analysis framework, the Commission, in an earlier order,
209 adopted the cost of service framework:

210 The July [1, 2015] Order concluded the Statute requires us to analyze those costs
211 and benefits arising out of the net metering program that affect PacifiCorp's cost
212 of service. . . .

¹⁵ Dr. Collins, Rebuttal, 14-035-114, lines 85-87.

213 While some issues remain to be resolved, we find the record supports our
214 adoption of the general [cost of service] framework . . . We believe this
215 framework captures the Legislature’s intent in enacting Subsection One and that
216 it will provide essential information when we commence our work under
217 Subsection Two. . . .

218 We believe the Legislature was careful to include the term “other customers” in
219 Subsection One because it was concerned about the near term impact net
220 metering has on the utility’s other *current* customers.¹⁶

221 Given the Commission’s prior studied opinion, and since Dr. Collins fails to provide
222 persuasive evidence to the contrary, the Commission should reject Dr. Collins’ argument
223 to abandon the cost of service framework.

224 **Q: IN REBUTTAL TESTIMONY THE OFFICE AND THE DIVISION ENTERED A JOINT**
225 **PROPOSAL. IS THE JOINT PROPOSAL STILL THE DIVISION’S POSITION?**

226 A: Yes, the Division supports the Joint Proposal. However, it has come to the Division’s
227 attention that there may be some question over the compensation pricing for each of
228 the rate classes in the Joint Exhibit, DPU Exhibit 1.1R.

229 The compensation pricing was intended for each schedule to reflect 95 percent of its
230 respective average retail rate excluding fixed charges. In the case of the residential
231 classes, however, the Joint Proposal relied on data for calendar year 2015 and not rates
232 and data adopted by the Commission in the last general rate case, Docket No. 13-035-

¹⁶ Order, 14-035-114, November 10, 2015, pp. 2, 4, 14.

233 184. For other rate schedules, the Joint Proposal used average retail rates provided in
234 response to Office data request 12.1. According to the Company, however, these
235 average retail rates included revenues from fixed and demand charges.

236 At the Office's and Division's request, the Company provided data consistent with its
237 reconciliation to the rates and data from the last rate case. Based on this data, the
238 Division updated the compensation rates for each schedule for the Joint Proposal. A
239 comparison of the original and updated rates is provided in Table 4. For convenience, I
240 also provide an updated Joint Exhibit detailing the Joint Proposal. The only change is in
241 the compensation rates found on page 3.

242 *Table 4: Compensation Rates (cents per kWh)*

SCHEDULE	ORIGINAL	UPDATED
Schedule 1, 2, 3	9.79	9.67
Schedule 23	9.57	8.39
Schedule 6	7.94	3.46
Schedule 6A	10.83	6.83
Schedule 6B	8.38	3.46
Schedule 8	7.06	3.57
Schedule 10	6.91	5.74

243

244 **Q: WILL YOU SUMMARIZE THE JOINT PROPOSAL?**

245 **A:** Yes. Under the Office and Division Joint Proposal:

- 246 • A proceeding to determine compensation rates for excess generation would
247 start as soon as practical after Commission order in this docket,
248 approximately September 2017.
- 249 • Existing NEM customers are defined as customers who interconnect before
250 January 1, 2018. These customers will be grandfathered under the statutory
251 NEM program for a defined period determined by the Commission. The Joint
252 Proposal recommends 12 to 17 years starting January 1, 2018.
- 253 • Transitional distributed generation customers, Transitional Customers, are
254 customers that interconnect either after December 31, 2017 but before the
255 end of the compensation docket, or until filling a cap of 200 MW.
256 Transitional Customers receive compensation for excess generation
257 measured on 15-minute intervals at a certain \$/kWh (based on customer
258 class) fixed for a Commission determined period. The Joint Proposal
259 recommends between 10 to 15 years, or January 1, 2028 to January 1, 2033.
- 260 • Post-Transitional customers interconnect after the end of the compensation
261 docket or after the transitional cap is met. Post-Transitional customers
262 receive compensation for excess generation as determined and approved by
263 the Commission in the compensation docket.

264 Other details are in the updated exhibit, DPU Exhibit 1.1R UPDATED, Joint Exhibit,
265 attached to this testimony.

266 **Q: DOES THAT CONCLUDE YOUR SURREBUTTAL TESTIMONY?**

267 A: Yes it does.