

1 **Q. Are you the same Rick T. Link that submitted direct and rebuttal testimony**
2 **in this proceeding?**

3 A. Yes.

4 **INTRODUCTION AND SUMMARY**

5 **Q. What is the purpose of your surrebuttal testimony?**

6 A. The purpose of my surrebuttal testimony is to respond to the rebuttal testimony of
7 Mr. Ken Dragoon filed on behalf of Utah Clean Energy (“UCE”). UCE continues
8 to question the Company’s modeling and certain assumptions used in the
9 calculation of loss of load probability. I also comment on the rebuttal testimony of
10 Mr. Charles E. Peterson filed on behalf of the Division of Public Utilities (“DPU”)
11 and the rebuttal testimony of Mr. Philip Hayet filed on behalf of the Office of
12 Consumer Services (“OCS”).

13 **Q. Please summarize your surrebuttal testimony.**

14 A. My surrebuttal testimony reaffirms that the capacity contribution values proposed
15 by the Company in this proceeding for wind and solar resources located in Utah are
16 accurately calculated and are reasonable. Specifically, my surrebuttal testimony
17 demonstrates that:

- 18 • All parties have accepted the Company’s use of the CF Method, all parties
19 find the Company’s capacity contribution values for wind resources
20 proposed by the Company to be reasonable, and DPU and OCS find the
21 Company’s capacity contribution values for solar resources to be
22 reasonable.
- 23 • UCE’s claim that the Company’s modeling may have been performed in

24 error is unsupported. The Company's modeling is accurate and the resulting
25 capacity contribution values are valid.

26 • The Company's capacity contribution study appropriately applies
27 forecasted unplanned maintenance outage assumptions when calculating
28 capacity contribution values for wind and solar resources.

29 **OVERVIEW OF PARTIES' POSITIONS**

30 **Q. Is any party challenging the Company's use of the capacity factor**
31 **approximation method ("CF Method") to calculate wind and solar capacity**
32 **contribution values?**

33 A. No.

34 **Q. Is any party challenging the capacity contribution value for wind resources**
35 **proposed by the Company?**

36 A. No.

37 **Q. Do the DPU and OCS support the capacity contribution values for solar**
38 **resources proposed by the Company?**

39 A. Yes. DPU reaffirmed its recommendation that the Commission accept the
40 Company's capacity contribution study, noting that the Company's estimates of the
41 capacity contribution factors are reasonable and comply with the Commission's
42 order in Docket No. 12-035-100. OCS states it is satisfied that PacifiCorp has
43 calculated reasonable capacity contribution values and recommends the
44 Commission adopt these values in place of the interim values established in Docket
45 No. 12-035-100.

46 **Q. Does UCE continue to have concerns with the Company’s proposed capacity**
47 **contribution values for solar resources?**

48 A. Yes. UCE continues to question certain assumptions used by the Company in the
49 Planning and Risk model (“PaR”), which is used to produce hourly loss of load
50 probability (“LOLP”) data. In its direct testimony, UCE suggested that LOLP data
51 from winter months (December through February) should be eliminated when
52 calculating capacity contribution values for wind and solar resources sited in the
53 east side of the Company’s system. In its rebuttal testimony, UCE claims that LOLP
54 data from Wyoming should be discounted when calculating solar capacity
55 contribution values for solar resources sited in Utah.

56 **SYSTEM MODELING**

57 **Q. Has UCE changed its position on the applicability of wintertime hourly system**
58 **LOLP data to the calculation of capacity contribution values for solar**
59 **resources?**

60 A. Yes. UCE admits that its direct testimony claim that wintertime loss of load events
61 are driven by west side load and caused by constrained transmission flows from the
62 east to the west side of the Company’s system is not supported by model results. In
63 fact, the model results in UCE’s work papers show wintertime loss of load events
64 not only occur in the west, but are also observed in Wyoming. In its rebuttal
65 testimony, UCE has shifted its focus to the wintertime loss of load events in
66 Wyoming, and characterizes this outcome as being unexpected due to the relatively
67 small population in the state. Because UCE believes these results are unexpected,
68 it asserts that there might be an error in the Company’s model. UCE further claims

69 that if the wintertime loss of load events in Wyoming are caused by transmission
70 constraints, these data should not be included in the calculation of capacity
71 contribution values.

72 **Q. Are the wintertime loss of load events in Wyoming the result of a modeling**
73 **error?**

74 A. No. UCE suggests that Wyoming loads are dominated by the oil and gas exploration
75 industry and therefore it is unexpected to see wintertime loss of load events in the
76 state. The data do not support this claim. As accurately noted by OCS in its rebuttal
77 testimony, Wyoming load has a seasonal pattern and peaks during winter months.¹

78 **Q. Are there any other variables, other than load, that contribute to loss of load**
79 **events?**

80 A. Yes. The availability of generating units also influences loss of load events. In fact,
81 it is the combined interaction of load and generating unit availability that drive loss
82 of load events. The Company captures this interaction in the modeling that produces
83 the LOLP data used to calculate the capacity contribution values for wind and solar
84 resources.

85 Loss of load events are most likely to occur when load is higher than
86 expected and when generating unit availability is lower than expected. The LOLP
87 increases in hours when load is higher than expected. PacifiCorp owns or purchases
88 output from over 1,250 MW of wind generating capacity in Wyoming. The LOLP
89 also increases when generating output from these wind facilities is lower than
90 expected. The LOLP increases further when these conditions are paired with an

¹ Rebuttal Testimony of OCS witness Philip Hayet at lines 203 – 210.

91 unplanned outage at one or more thermal generating units in the region.

92 **Q. Can transmission constraints contribute to loss of load events in Wyoming?**

93 A. Yes. As I describe in my rebuttal testimony, the Company's system is simulated
94 using a transmission topology that captures major load centers, generation
95 resources, and market hubs interconnected via firm transmission paths. The
96 transmission paths limit the amount of energy that can flow across a path at any
97 given point in time.

98 When load exceeds available energy from local resources (i.e., resources
99 within the load area), the transmission system is used to import energy into the load
100 area. If there is sufficient import capability into the load area, load is met. A loss of
101 load event occurs if flows across a transmission path into a load area reach the
102 maximum capability and load continues to exceed available local energy and
103 imported energy.

104 **Q. Do you agree with UCE's claim that any wintertime loss of load events in**
105 **Wyoming caused by transmission constraints should be eliminated from the**
106 **calculation of capacity contribution values?**

107 A. No. As discussed above, loss of load events occur only after available local
108 resources and imports are exhausted. UCE has not explained why it believes
109 excluding loss of load events coinciding with transmission constraints should only
110 be applied to wintertime events in Wyoming. Eliminating all loss of load events
111 that are influenced by transmission limits could eliminate most if not all loss of load
112 events across most if not all hours, which is an absurd result. This argument
113 suggests that wind and solar resources only contribute to the reliability of the local

114 load area in which they are sited. Such a position is inconsistent with resource
115 planning principals and completely ignores the reliability benefits of the
116 Company's transmission system. Moreover, as I noted in my rebuttal testimony,
117 The NREL study that the Company relied upon when applying the CF Method to
118 calculate capacity contribution values for wind and solar resources does not identify
119 limitations of the method when applied to a system with transmission constraints.²

120 **Q. Does UCE suggest that the Company should have selected a different test year**
121 **for the capacity contribution study?**

122 A. Yes. UCE argues that the 2017 test year used to support the Company's capacity
123 contribution study represents a resource sufficiency period and that it would be
124 more logical to choose a year in which the Company is resource deficient.

125 **Q. How do you respond?**

126 A. The Company conducts its resource planning to ensure there is sufficient capacity
127 on its system to meet its firm coincident peak obligation inclusive of a planning
128 reserve margin.³ To ensure resource adequacy is maintained over time, the
129 Company's resource portfolio includes sufficient resource capacity to meet its firm
130 coincident peak obligation in all years through a 20-year planning horizon. As such,
131 the Company's resource plan is developed to ensure it has sufficient resources to
132 provide reliable service for its customers over the long term.

133 I disagree with UCE's claim that a test year in which the Company is
134 resource deficient would be appropriate for the capacity contribution study. Such

² The NREL study was provided as Exhibit RMP____(RTL-2) to my Direct Testimony.

³ The Company defines its firm obligation as load less interruptible contracts and less existing energy efficiency resource.

135 an approach would distort capacity contribution values for wind and solar resources
136 by producing LOLP data that would be misaligned with reliability targets used in
137 the Company's planning process. Moreover, the 2015 integrated resource plan
138 preferred portfolio shows the Company is not resource deficient until 2028. It is not
139 sensible to select a test year that far into the future.

140 **PLANNED MAINTENANCE**

141 **Q. Does UCE continue to raise concerns with the Company's planned**
142 **maintenance assumptions?**

143 A. Yes. UCE continues to assert that the Company assumed an overabundance of
144 planned maintenance in April. UCE states that energy shortages are not expected
145 to occur in April.

146 **Q. How do you respond?**

147 A. Any time generating resources are taken offline for planned maintenance there is
148 an increased risk that unexpected fluctuations in load and generating unit
149 availability can cause reliability events. However, this does not mean that energy
150 shortages are *expected* to occur during the planned maintenance outage cycle.
151 Clearly, the Company would not schedule planned maintenance outages if it
152 expected energy shortages to cause a loss of load event. While the risk of loss of
153 load events increases during planned maintenance outages, the likelihood of a loss
154 of load event occurring during scheduled maintenance remains relatively low.

155 As stated in my rebuttal testimony, the Company considers projected load
156 and availability of other resources when developing its planning maintenance
157 schedules. The Company also considers specific maintenance tasks, duration,

158 permit obligations, weather, location, availability of labor and/or contractors and
159 materials, projected load and operating reserve needs, generating capability,
160 availability of other generation facilities across the fleet, costs of replacement
161 power, and availability of purchased power. UCE states that energy shortages are
162 not expected to occur in April, which is precisely why this month is a good
163 candidate for planned maintenance.

164 **Q. Is it logical to spread planned maintenance just for the purpose to reduce loss**
165 **of load events?**

166 A. No. In addition to being arbitrary and inconsistent with operational plans, spreading
167 planned maintenance to other months would not necessarily reduce the number of
168 loss of load events. Any hour in which load exceeds available resources is counted
169 as a loss of load event for that hour regardless of whether load exceeds available
170 resources by 10 MW or 100 MW. In addition, as I stated in my rebuttal testimony,
171 and as also pointed out by DPU and OCS, moving planned maintenance outages
172 from April to March will increase net power costs.

173 **CONCLUSION**

174 **Q. How do you describe the process that the Company used to develop the**
175 **capacity contribution of wind and solar resources?**

176 A. The process follows three basic steps: 1) determine the loss of load events using the
177 PaR model with 500 stochastic iterations; 2) count loss of load events for the system
178 in each hour of the year to calculate hourly LOLP; and 3) calculate capacity
179 contribution values by multiplying the capacity factor of wind and solar resources
180 by the coincident hourly LOLP. At the request of the DPU, NREL reviewed the

181 Company's calculations and found "that [the Company] has exactly followed the
182 equations, methodology, and assumptions in the NREL report, 'Comparison of
183 Capacity Value Methods for Photovoltaics in the Western United States.'"⁴

184 **Q. Did the Company provide sufficient data in this proceeding to support the**
185 **review of the Company's calculations by parties?**

186 A. Yes. I provided work papers supporting the Company's calculations with my direct
187 testimony. The Company provided additional work papers through the discovery
188 process including load forecast data, stochastic shocks applied to load, forced
189 outage rate data for thermal plants, stochastic shocks to forced outage rates, planned
190 maintenance schedule data, and loss of load event (energy-not-served "ENS") data.
191 Where applicable these data were provided by area by hour and by iteration. The
192 Company has provided sufficient data for parties to review and understand the
193 Company's analysis and calculations, which is evident in the direct and rebuttal
194 testimony of DPU and the rebuttal testimony of OCS. UCE's claim that the
195 Company's results are not dependable is unsupported.

196 **Q. Please summarize the conclusions of your surrebuttal testimony.**

197 A. The conclusions of my surrebuttal testimony are as follows:

- 198 • All parties have accepted the Company's use of the CF Method to calculate
199 capacity contribution values for wind and solar resources.
- 200 • All parties find the Company's proposed capacity contribution values for
201 wind resources to be reasonable.
- 202 • DPU and OCS find the Company's proposed capacity contribution values

⁴ DPU Exhibit 1.1 to the Direct Testimony of DPU witness Charles E. Peterson.

203 for solar resources to be reasonable.

204 • UCE’s finding that wintertime loss of load events in Wyoming are
205 unexpected, and therefore in error, is unsupported.

206 • UCE’s claim that loss of load events occurring when transmission is
207 constrained should be excluded from capacity contribution calculations is
208 misaligned with basic resource planning principals and ignores reliability
209 benefits of the Company’s transmission system.

210 • The Company’s capacity contribution study appropriately applies
211 forecasted unplanned maintenance outage assumptions when calculating
212 capacity contribution values for wind and solar resources.

213 **Q. What is your recommendation?**

214 A. The Company’s proposed capacity contribution values for wind and solar resources
215 are reasonable and were calculated accurately. I recommend that the Commission
216 adopt the capacity contribution values proposed by the Company in this proceeding
217 for purposes of establishing capacity payments for wind and solar QF projects
218 under the PDDRR method.

219 **Q. Does this conclude your surrebuttal testimony?**

220 A. Yes.