

REDACTED

Rocky Mountain Power

Docket No. 17-035-39

Witness: Timothy J. Hemstreet

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF UTAH

ROCKY MOUNTAIN POWER

REDACTED

Supplemental Rebuttal Testimony of Timothy J. Hemstreet

April 2018

1 **Q. Are you the same Timothy J. Hemstreet who previously provided testimony in this**
2 **case on behalf of PacifiCorp dba Rocky Mountain Power (the “Company”)?**

3 A. Yes.

4 **PURPOSE OF SUPPLEMENTAL REBUTTAL TESTIMONY**

5 **Q. What is the purpose of your supplemental rebuttal testimony in this proceeding?**

6 A. I respond to the testimony and recommendations of the Utah Division of Public Utilities
7 (“DPU”) witnesses Dr. Joni S. Zenger and Mr. Daniel Peaco.

8 **Q. Please summarize your testimony.**

9 A. I explain that the Public Service Commission of Utah (“Commission”) should approve
10 the Company’s repowering project because it is in the public interest. The repowering
11 project will provide substantial net benefits to Utah customers, and presents the lowest,
12 reasonable-cost resource choice for the continued operation of the wind energy
13 resources. As project implementation has continued, the Company’s cost and
14 performance estimates have become more certain, resulting in decreasing risk. As of
15 this filing, the cost estimates are largely fixed and contractual provisions mitigate the
16 risk that construction delays will compromise production tax credit (“PTC”) eligibility.
17 Also, engineering studies are complete, confirming the equipment selected for
18 repowering and any necessary foundation work. The Company’s cost estimate remains
19 unchanged from its supplemental filing in February 2018, which is lower than the
20 original cost estimate in the Company’s initial filing.

21 The pace and timing of the Company’s project implementation are consistent
22 with projects of this scope and consistent with the preapproval process allowed by Utah
23 law. Throughout this case, the Company has provided the parties and the Commission

24 the most up-to-date information, based on changes in federal tax law, market
25 conditions, and project implementation. In this way, the Company has ensured that the
26 Commission and the parties have full and complete information on which to examine
27 the merits of the repowering proposal.

28 Given the benefits of the wind repowering project, the DPU has not provided a
29 sound rationale for its recommendation against the project. I address each of the DPU's
30 objections and explain why none of them undermine the value proposition of wind
31 repowering for customers.

32 **REASONABLENESS OF FEBRUARY 2018 SUPPLEMENTAL FILING**

33 **Q. Dr. Zenger implies that the Company's supplemental filing on February 1, 2018,**
34 **was improperly "an entirely new case with updated assumptions and new**
35 **projected economic costs and benefits." (Zenger Resp., lines 126–128.) Was the**
36 **Company's supplemental filing within the scope of the parties' agreement**
37 **regarding the extension of the procedural schedule in this case?**

38 **A.** Yes. The DPU supported Rocky Mountain Power's Unopposed Motion to Amend
39 Procedural Schedule, filed on November 22, 2017. In that motion, the parties agreed
40 that the Company "will file testimony that includes an updated economic analysis on a
41 project-by-project basis." Parties expressly agreed that the Company's supplemental
42 testimony would include "updates for known changes in wind repowering costs and
43 performance," among other items.

44 My supplemental testimony included updates for known changes in wind
45 repowering costs and performance based on continued contract negotiations,
46 competitive market procurement activities, and engineering and design studies.

47 I updated cost estimates to reflect: (1) known changes in project costs as a result of
48 completing final design of the Goodnoe Hills and Leaning Juniper projects, which
49 resulted in changed costs to reflect foundation retrofits; (2) a changed turbine type at
50 the Leaning Juniper facility; and (3) information from bids received for installation of
51 the Vestas turbines. Overall, project costs increased from the Company's October 2017
52 filing by 1.7 percent.

53 Additionally, the Company updated its energy production/performance
54 estimates to reflect: (1) the final design of the Leaning Juniper turbine type;
55 (2) increased transmission interconnection capacity available for the Marengo facilities
56 following the completion of transmission studies; and (3) four years of available
57 historical data in the energy production estimates for all facilities using data that was
58 previously unavailable. These updates resulted in a 0.1 percent reduction in the energy
59 performance described in the Company's October 2017 filing.

60 The Company's February 2018 supplemental filing included the updates
61 contemplated by the parties. A 1.7 percent change in project costs and 0.1 percent
62 reduction in energy benefits in the Company's supplemental filing hardly reflects "an
63 entirely new case."

64 **Q. Dr. Zenger also suggests that some of the updates included in the February 2018**
65 **supplemental testimony "should have been filed in the Company's initial**
66 **Application." (Zenger Resp., lines 120–122.) Would it have been possible to**
67 **include any of the cost and performance updates from your supplemental**
68 **testimony when the Company filed its initial application in June 2017?**

69 **A.** No. Dr. Zenger never indicates which updates should have been provided in June 2017,

70 but the updated cost and performance information included in my supplemental
71 testimony was not known in June 2017.

72 **Q. Dr. Zenger also claims that the Company’s supplemental filing raised additional**
73 **uncertainties because the DPU “discovered” that the Leaning Juniper and**
74 **Goodnoe Hills facilities will require “unplanned” costs. (Zenger Resp., lines 214–**
75 **216.) Was the supplemental filing the first time the Company disclosed that**
76 **additional foundation studies were occurring for Leaning Juniper and Goodnoe**
77 **Hills?**

78 A. No. In my direct testimony filed in June 2017, I stated that “[f]or Leaning Juniper and
79 Goodnoe Hills, foundation load evaluations have not yet been completed because those
80 facilities are still under design review, which is expected to be completed by this fall.”
81 (Hemstreet Direct, lines 479–481.) Contrary to Dr. Zenger’s implication that the
82 Company was unaware of the possibility that additional foundation retrofits would be
83 required, the Company disclosed the fact that these studies were ongoing in June 2017,
84 which meant that the initial cost estimates were subject to change. The studies were
85 completed on schedule and the costs are now included in the economic analysis.

86 **Q. Dr. Zenger further claims that verification of the suitability of the foundations for**
87 **repowering is “first order due diligence that the Company should have performed**
88 **if it were planning wisely.” (Zenger Resp., lines 225-226.) Do you agree?**

89 A. No. My testimony has been clear that verifying the suitability of the foundations for
90 the new turbines is a critical due diligence component, and that the Company would
91 confirm the suitability of the foundations before executing contracts. (*See, e.g.*,
92 Hemstreet Direct, lines 481–483.) The Company designed the overall schedule of the

93 wind repowering project to minimize costs and risks. Fully consistent with that
94 schedule, the Company has now verified that the foundations at all the facilities will be
95 able to handle the loads of the new turbines.

96 **Q. Is Dr. Zenger’s claim that the Company acted too slowly on foundation**
97 **verification inconsistent with her earlier criticism of the Company for engaging in**
98 **preliminary work on the repowering project in advance of seeking preapproval?**

99 A. Yes. In her direct testimony, Dr. Zenger faulted the Company for seeking preapproval
100 of the repowering project while engaging in preliminary work on project
101 implementation in advance of the Company’s filing. (Zenger Direct, lines 88–95, 121–
102 125.) It is inconsistent for Dr. Zenger to now fault the Company for not having done
103 more preliminary implementation work for Leaning Juniper and Goodnoe Hills.

104 **Q. Dr. Zenger next claims that “the Company’s supplemental testimony shows that**
105 **it might have to go to its parent company, Berkshire Hathaway Energy, to bail out**
106 **PacifiCorp so that the Company will have an adequate supply of safe harbor**
107 **equipment to still qualify for 100 percent of the PTCs.” (Zenger Resp., lines 241–**
108 **244.) Is this a fair characterization of the Company’s earlier testimony?**

109 A. No. In my supplemental direct testimony, I explained that all of the Company’s
110 facilities had more than adequate safe harbor equipment, noting the substantial cushion
111 for each facility between the projected costs and the safe harbor requirements (allowing
112 from between 65 percent and 5300 percent cost increase, depending on the facility).
113 (Hemstreet Supp. Direct, lines 167–172.) As an additional customer safeguard, I also
114 noted that the Company can use safe harbor equipment from its parent company, if
115 necessary. My testimony demonstrated the Company’s careful, conservative planning,

116 and its risk mitigation options for compliance with safe harbor requirements. It is not
117 clear how Dr. Zenger could interpret my testimony as suggesting that the Company
118 might need a “bail out” to qualify for 100 percent of the PTCs.

119 **RELIABILITY OF COST ESTIMATES**

120 **Q. Dr. Zenger states that “the Division has little confidence in the latest version of**
121 **repowering costs and benefits provided in the Company’s supplemental filing”**
122 **because the estimated benefits have “been so widely scattered.” (Zenger Resp.,**
123 **lines 62-65.) Have the estimated costs of the repowering project changed in a way**
124 **that undermines their reliability?**

125 A. No, the Company’s current cost estimate is \$1.101 billion, a 2.4 percent decrease from
126 the Company’s estimated project costs of \$1.128 billion in its initial filing in June 2017.
127 This is the same cost estimate contained in the Company’s supplemental filing in
128 February 2018. The Company’s interim cost estimate in October 2017, was
129 \$1.083 billion, which reflected contracts negotiated with turbine suppliers after the
130 initial filing, but did not yet include the costs of foundation retrofits later determined
131 necessary at the Goodnoe Hills and Leaning Juniper facilities and updated turbine
132 specifications for the Leaning Juniper facility.

133 **Q. Dr. Zenger also claims that the total project costs are \$1.337 billion as of**
134 **February 1, 2018. (Zenger Resp., lines 140–143.) Is this correct?**

135 A. No. As described in my supplemental direct testimony cited by Dr. Zenger, the
136 estimated cost of the repowering project is \$1.101 billion. The Company is unclear of
137 the source of Dr. Zenger’s \$1.337 billion figure. Dr. Zenger may be mistakenly
138 referencing the cost estimate for a sensitivity case that the Company evaluated which

139 includes additional energy collector system upgrade costs. The cost of that sensitivity
140 case is \$1.137 billion, however, not \$1.337 billion.

141 The sensitivity includes the wind facility energy collector system upgrade costs
142 necessary to allow the Wyoming facilities to interconnect to the transmission system at
143 the full output capacity of the repowered turbines. The Company has not proposed to
144 move forward with this option at this time, pending additional feasibility and economic
145 review. To be clear, the base case repowering project cost estimate used in the economic
146 analysis described by Mr. Rick T. Link does not include these network upgrade costs
147 or associated benefits.

148 **Q. Did the Company make any changes to its assumptions regarding run-rate capital**
149 **expenditures or avoided capital costs anticipated from replacing impacted**
150 **gearboxes or blades experiencing higher failure rates?**

151 A. No. These assumptions have been unchanged throughout the case.

152 **Q. Why have project costs and energy benefits changed during this proceeding?**

153 A. Since the Company filed its request for resource approval, development and design of
154 the repowering project has continued, as has the competitive solicitation and contract
155 negotiation process. Project costs included in the Company's filings appropriately
156 reflect the most recent information available. Thus, the February 2018 supplemental
157 filing included the final design of the Leaning Juniper and Goodnoe Hills projects and
158 their associated foundation review, and the changes in cost and energy production
159 resulting from the ability of the Marengo facilities to operate at a higher repowered
160 capacity under a revised interconnection agreement.

161 Throughout this case, the Company has incorporated into its analysis the most

162 up-to-date wind turbine technology as engineering studies and equipment offerings
163 have matured, and incorporated more competitive pricing achieved through
164 negotiations with suppliers. Overall, these updates have been minor and have not
165 materially affected the scope of the repowering project, or the Company's methodology
166 in evaluating the costs of the projects. The Company reflected these updates to increase
167 the accuracy and transparency of its filing.

168 **Q. Has the Company provided detailed cost estimates for the project?**

169 A. Yes. Through discovery, the Company has provided its detailed, confidential cost
170 estimates including all of its assumptions regarding costs for equipment, equipment
171 storage and maintenance, engineering, permitting, project management, property due
172 diligence, site civil engineering and construction installation costs, construction
173 management, contingency, construction standby time due to high wind conditions,
174 applicable sales and property taxes, and allowance for funds used during construction
175 ("AFUDC"). These cost estimates have also included all of the Company's assumptions
176 regarding avoided capital costs due to repowering as well as changes to operations and
177 maintenance costs expected as a result of the project.

178 **Q. Does Dr. Zenger identify any specific component of the Company's cost estimate**
179 **that she believes is unreliable?**

180 A. No.

181

DECREASING RISK

182

Q. Dr. Zenger claims that customers’ “uncertain benefits could materialize or disappear, depending on the suite of unknowns and risks that happen.” (Zenger Resp., lines 164–166.) Does Dr. Zenger dispute the Company’s evidence that it has successfully mitigated much of the risk associated with the repowering project?

183

184

185

186

A. No. As described in my past testimony, the Company has made significant progress mitigating customer risk:

187

188

189

190

- The Company has fully negotiated a turn-key agreement with GE for repowering the Wyoming wind projects. Thus, the costs for eight of the 12 repowering projects are now fixed.

191

192

- The GE contract includes a full service agreement, meaning that the costs for operations and maintenance [REDACTED] are fixed.

193

194

- The GE and Vestas contracts provide availability guarantees, making the production estimates more certain.

195

196

197

- The GE contract includes damages in the event that GE fails to meet the December 31, 2020, deadline for PTC eligibility that will effectively make customers whole.

198

199

200

201

- The Company has negotiated a turbine supply contract for the Oregon and Washington projects, meaning that the turbine costs of the remaining four projects are now fixed and the contract includes robust protections to guarantee on-time delivery.

202

203

- The Company has obtained the major necessary permits for 11 of the 12 repowering projects.

204

205

206

207

- Eleven of the 12 facilities that will be repowered are planned to be in service in 2019, more than a year before the December 31, 2020, PTC deadline. The only facility that will be repowered in 2020 is Dunlap, which will be repowered by GE subject to the contract provisions noted above that mitigate delay risk.

208

209

- The foundation design studies for Leaning Juniper and Goodnoe Hills are now complete and the costs for these upgrades are known.

210 **Q. According to Dr. Zenger, DPU is skeptical of the Company's ability to find**
211 **available contractors to install new wind turbine equipment and construct the**
212 **projects that are being replaced with Vestas turbines on time and within budget**
213 **before the December 31, 2020 deadline. (Zenger Resp., lines 184–202.) Do you**
214 **believe this is a realistic risk?**

215 A. No. The Company's request for proposals to install the Vestas turbines resulted in
216 multiple, well-qualified wind energy construction contractors offering proposals to
217 complete the installation and commissioning of the turbines in 2019, consistent with
218 the Company's construction schedule. Thus these projects will be in-service one year
219 before the December 31, 2020, deadline for qualifying for 100 percent of the federal
220 production tax credit. The Company has evaluated the proposals received and is now
221 in final contract negotiations with the construction contractors. While the Company
222 expected to execute the Vestas installation contract by March 2018, the Company has
223 extended the timeline slightly to align with the current schedule for regulatory review.

224 **Q. Dr. Zenger claims that the Company has stated that it may have to stagger in-**
225 **service dates to accommodate the availability of the Vestas installation contractor.**
226 **(Zenger Resp., lines 196–198.) Is this accurate?**

227 A. No. Dr. Zenger mischaracterizes my past testimony in this case. Although Dr. Zenger
228 cites my testimony filed in the Wyoming repowering case (Docket No. 20000-519-EA-
229 17), I filed substantively identical testimony in this case. (*See Surrebuttal Testimony of*
230 *Timothy J. Hemstreet, lines 96–115.*) I opposed a condition recommended by
231 Mr. Kevin Higgins, testifying on behalf of the Utah Association of Energy Users, which
232 would have penalized the Company for any deviations from its filed construction

233 schedule. I simply noted in my surrebuttal testimony that such a condition is
234 unreasonable because the Company could deviate from its planned schedule for prudent
235 reasons such as accommodating the availability of a construction contractor that offered
236 the best price, while still meeting required project deadlines.

237 **Q. Is the Company planning to alter its construction schedule?**

238 A. No. The Company's construction schedule has not changed.

239 **Q. Dr. Zenger states that there "is little assurance that there will not be a disruption
240 or problem of some type with construction and installation of the new equipment."
241 (Zenger Resp., lines 198–200.) Does Dr. Zenger raise any particular issues,
242 technical concerns, or schedule risks that threaten the ability of the Company to
243 complete the repowering project on its current construction schedule?**

244 A. No. Dr. Zenger does not offer any explanation of the alleged risk. Notably, Dr. Zenger
245 does not dispute my prior testimony describing the numerous customer protections in
246 the repowering project contracts specifically designed to mitigate construction and
247 installation risk.

248 **Q. Dr. Zenger further states that if any of the projects "are one day late, the federal
249 PTC may either be lost, or drop to 80 percent instead of 100 percent, increasing
250 the risk that the projects will be uneconomic for customers." (Zenger Resp., lines
251 200–202.) Is this statement accurate?**

252 A. No. Dr. Zenger implies that the Company's construction schedule calls for the
253 repowering project to be completed on December 31, 2020, which is not true. While
254 the repowered turbines must be in-service by December 31, 2020, to qualify for the full
255 value of the PTC, the Company has not designed its project schedule to achieve

256 commercial operations of the repowered facilities on December 31, 2020—the day of
257 the deadline. Rather, the Company’s construction schedule anticipates completion of
258 all but one project in 2019. Thus with 11 of the 12 facilities planned to be in service on
259 or before November 1, 2019, those facilities would need to be more than 427 days
260 late—not a single day late—for PTC qualification to be at risk due to schedule delay.
261 And the twelfth facility, the Dunlap project, would need to be one full month late, not
262 one day late to be at risk. The schedule for repowering Dunlap is designed to maximize
263 the current PTCs that are generated by that facility and therefore it will be the final
264 project repowered before the December 31, 2020, deadline. As discussed above and in-
265 depth in my rebuttal testimony, the risk of lost PTCs for the GE projects—such as
266 Dunlap—due to schedule delays has been contractually mitigated through the GE
267 retrofit contract, under which GE will pay liquidated damages that represent the full
268 costs of any turbine that is not repowered by December 31, 2020.

269 **Q. During the original construction of the wind facilities proposed to be repowered,**
270 **did the Company ever experience construction delays that resulted in**
271 **commissioning of the facilities being delayed more than one year from the planned**
272 **in-service date or failing to qualify for PTCs?**

273 A. No. The Company has never experienced construction delays of a duration that would
274 be necessary to threaten PTC qualification in this case and all of its projects achieved
275 full PTC benefits for customers.

276 **Q. Mr. Peaco acknowledges that the Company has provided additional evidence that**
277 **it is well-positioned to meet the PTC safe harbor requirements. Mr. Peaco also**
278 **claims, however, that “the PTC qualification risks that remain are largely within**
279 **the Company’s control to manage, but, as in the prior testimony, the Company is**
280 **not agreeing to assume any of the remaining risk.” (Peaco Resp., lines 579–586.)**

281 **Is this accurate?**

282 A. No. The Company has agreed to fully assume all PTC risks associated with factors
283 within its control, as described in “prior testimony” (Crane Rebuttal, lines 103–109.)
284 and reiterated in the supplemental rebuttal testimony of Mr. Gary W. Hoogveen.
285 Mr. Peaco cites this commitment, but does not explain what risks remain uncovered.
286 (Peaco Resp. n. 40.) Moreover, Mr. Peaco does not dispute my testimony that the
287 Company would have to experience huge cost overruns for non-fixed costs (between
288 65 and 5,300 percent) to jeopardize the five-percent PTC safe harbor requirement.
289 (Hemstreet Supp. Conf. Table 1.)

290 **Q. Mr. Peaco reiterates his claim that there is risk that the repowered projects will**
291 **have shorter useful lives than assumed in the Company’s analysis, and that the**
292 **Company provided no additional evidence addressing this risk. (Peaco Resp., lines**
293 **625–626.) What is the basis for Mr. Peaco’s concern?**

294 A. Mr. Peaco contends that there is risk that the economic life of the repowered assets
295 could be less than their 30-year book life, and that the existing assets could potentially
296 stay in service longer than the 30 years assumed in the Company’s economic analysis.
297 He believes that this poses a risk to the economic benefits of the projects, given the
298 substantial incremental energy production available from the repowered facilities after

299 the original assets would have retired.

300 **Q. Do you believe this is a significant concern?**

301 A. No. As Mr. Peaco noted in his earlier testimony (Peaco Direct, lines 862–863), the
302 Company’s assumptions related to asset life are consistent between the existing assets
303 and the repowered assets. Additionally, the risk that the economic life of the wind assets
304 may not match their book lives is a risk faced by both the existing wind assets and the
305 repowered assets. The potential also exists that the existing assets could have an
306 economic life of fewer than 30 years and that the repowered assets—incorporating the
307 latest wind turbine technology—could have an asset life greater than 30 years. In either
308 situation, the repowering project results in increased benefits compared to the status
309 quo case.

310 **Q. Does Mr. Peaco offer any proposal for how this “risk” could be mitigated by the**
311 **Company, or even evaluated on a going-forward basis?**

312 A. No.

313 **Q. Mr. Peaco has also contended that PTC qualification for some projects could be**
314 **at risk due to failing the 80/20 rule if, for example, the value of the retained assets**
315 **were to increase by 10 percent. (Peaco Surrebuttal, lines 459–465.) Is that**
316 **accurate?**

317 A. No. As shown in Table 1 below, Mr. Peaco’s statement is incorrect. Under Mr. Peaco’s
318 hypothetical, only seven turbines at the Glenrock III project constructed on a specific
319 foundation type that required deep dynamic compaction would fail, not the entire
320 project. Further, the repowering costs would still be sufficient for 588 of the
321 595 turbines proposed for repowering, and the margins above the requirement are

322 substantial even in this hypothetical situation.

323 **Confidential Table 1: 80/20 Rule Spending Requirements by Project Assuming**
 324 **10 Percent**
Increase in Ernst & Young Preliminary Fair Market Valuation

Facility Name	Turbine Foundation Type	# of Turbines	110% of Ernst & Young Preliminary FMV of Retained Components Per Turbine 12/31/2018 (\$000s)	Minimum Threshold of New Turbine Costs Required (\$000s)	Qualifying Repowering Costs Per Turbine (\$000s)	New Turbine Costs in Excess of Requirement (\$000s)
Goodnoe Hills	Standard	47	████	████	████	████
Marengo I	Standard	78	████	████	████	████
Leaning Juniper	Standard	67	████	████	████	████
Glenrock I	Standard	58	████	████	████	████
Marengo II	Standard	39	████	████	████	████
McFadden Ridge	Standard	19	████	████	████	████
Rolling Hills	Standard	42	████	████	████	████
Seven Mile Hill I	Standard	57	████	████	████	████
Seven Mile Hill I	Dynamic	9	████	████	████	████
Glenrock III	Standard	13	████	████	████	████
High Plains	Standard	66	████	████	████	████
Seven Mile Hill II	Standard	13	████	████	████	████
Dunlap	Standard	74	████	████	████	████
Rolling Hills	Dynamic	6	████	████	████	████
Glenrock III	Dynamic	7	████	████	████	████

325 **Q. What do you conclude about the risk of not qualifying for PTCs due to failure to**
 326 **meet the 80/20 test?**

327 **A.** The risk of not qualifying for PTCs due to failure to meet the 80/20 test is low.
 328 Mr. Peaco raised this risk in his surrebuttal testimony filed in November 2017, in which
 329 he also noted that he had not reviewed the Ernst & Young preliminary valuation reports
 330 in detail. Having now had several additional months to review those reports, Mr. Peaco
 331 has not raised any additional concerns in his response testimony about those reports,
 332 the valuation methodology upon which they are based, or the ability of the repowered
 333 turbines to meet the 80/20 test. Further, given the methodology described in the

334 valuation reports—which relies upon a cost approach to value the retained
335 components—Mr. Peaco has provided no support to the risk he previously identified
336 that the valuation could increase 10 percent. Given the cost approach of the valuation
337 methodology, and the fact that the Company’s costs for the wind facilities is known and
338 fixed, there is no reasonable basis to conclude that the valuation could increase
339 10 percent as Mr. Peaco speculated.

340 **SUFFICIENCY OF INFORMATION PROVIDED WITH THE COMPANY’S**
341 **APPLICATION AND IN DISCOVERY**

342 **Q. Dr. Zenger faults the Company for filing its case “before much due diligence and**
343 **preparatory work was completed.” (Zenger Resp., lines 290–291.) Do you agree**
344 **with this assessment?**

345 A. No. Before its initial filing in June 2017, the Company had completed engineering
346 design and review for 10 of the 12 projects, including foundation suitability
347 assessments. The Company had verified the suitability of the repowering equipment at
348 those 10 facility locations, obtained energy production estimates for all the projects
349 using best available information, and the Company had filed requests to modify its
350 interconnection agreements to reflect the new capacity of the repowered facilities. The
351 Company had also made substantial progress in negotiating its contracts to execute the
352 repowering project-and has now made the final form of turbine supply and retrofit
353 contracts available. As I note above, it is ironic that Dr. Zenger’s direct testimony
354 faulted the Company for doing too much work to implement repowering before filing
355 its application, and now Dr. Zenger faults the Company for doing too little.

356 The Company has provided an extraordinary amount of information in its
357 filings, testimony, and discovery responses, completed a significant amount of

358 engineering and technical analysis before filing its application, and made this
359 engineering and due diligence information available to all parties. As additional
360 engineering work has been completed, the Company has filed supplemental data
361 responses to provide the latest information available. The Company has laid out the
362 technical work that has been completed (e.g., turbine suitability evaluations, energy
363 production assessments, foundation suitability analyses), and has described the further
364 technical due diligence that will be obtained, such as the third-party design
365 certification.

366 Moreover, it is unclear what additional due diligence and preparatory work Dr.
367 Zenger believes the Company should have completed before filing. Dr. Zenger provides
368 a single example of “work and analysis that remains outstanding”—the third-party
369 design certifications. (Zenger Resp., lines 307–348.) But as the Company explained in
370 discovery, third-party design certification is provided pursuant to the turbine supply
371 and retrofit contracts that the Company has not yet executed. Thus, Dr. Zenger faults
372 the Company for having not obtained deliverables from the turbine suppliers pursuant
373 to contracts the Company has not yet executed.

374 **Q. Dr. Zenger further suggests that requests for approval of a voluntary resource**
375 **decision related to wind projects should strictly comply with the filing**
376 **requirements developed after the conclusion of Docket No. 09-035-23 for recovery**
377 **of wind project costs. (Zenger Resp., lines 365–380.) How do you respond?**

378 A. I disagree that the Company’s request was lacking in detail, and I disagree that the
379 additional information Dr. Zenger requests applies to a voluntary request for approval
380 of a resource decision like repowering. As I understand it, the issue in Docket No. 09-

381 035-23 involved how to present sufficient detail on wind project costs to allow for a
382 meaningful prudence review in a general rate case. Thus, the information that the
383 Company agreed to provide includes information like the turbine purchase price,
384 turbine purchase date, final turbine placement, pricing and terms for the land lease
385 associated with a wind project, and description of change orders occurring during
386 project implementation. *See* Exhibit 1.2-RESP. Reviewing the information the DPU
387 wants indicates that much of it is known only after a wind project is completed and
388 placed in-service. It makes little sense to require an application for preapproval to
389 include this information when, by definition, it does not yet exist. In addition, very little
390 of the information that Dr. Zenger claims is lacking from the Company’s filing is
391 included in the requirements set forth in Exhibit 1.2-RESP.

392 **Q. Does Dr. Zenger point to any other specific items that *are* included in Exhibit 1.2-**
393 **RESP that DPU has not been able to review?**

394 A. No.

395 **SUFFICIENCY OF THE DATA USED FOR ENERGY PRODUCTION ESTIMATES**

396 **Q. Dr. Zenger claims that the Company’s energy production estimates are “seemingly**
397 **supported by relatively little data.” (Zenger Resp., lines 209–212.) Do you agree**
398 **with this assessment?**

399 A. I strongly disagree, and note that Dr. Zenger offers no basis for her claim. The
400 Company’s estimates are based on energy production data for every single turbine at
401 each facility for every 10-minute interval over a four-year period. I am not aware of
402 any more accurate method—nor is the Company’s engineering consultant Black &
403 Veatch—that could be used to forecast the increased energy production expected from

404 repowering. Dr. Zenger herself proposes no alternative approach.

405 **Q. Mr. Peaco states that there is uncertainty in the Company’s energy production**
406 **estimates because only four years of operating history was used to assess the**
407 **expected increase in energy production. (Peaco Resp., lines 620–622.) Do you**
408 **believe that four years of historical data is sufficient to assess long-term energy**
409 **increases with repowering?**

410 A. Yes. The Company’s estimates of the increased energy production from repowering are
411 based on four years of historical operations data from 2013–2016, incorporating the
412 actual production history of every single wind turbine at the facilities that will be
413 repowered. The Company used the 2013–2016 historical period because this allows
414 energy production to be assessed over a long enough period to cover variability in wind
415 conditions, and thus annual generation, and align with long-term averages.

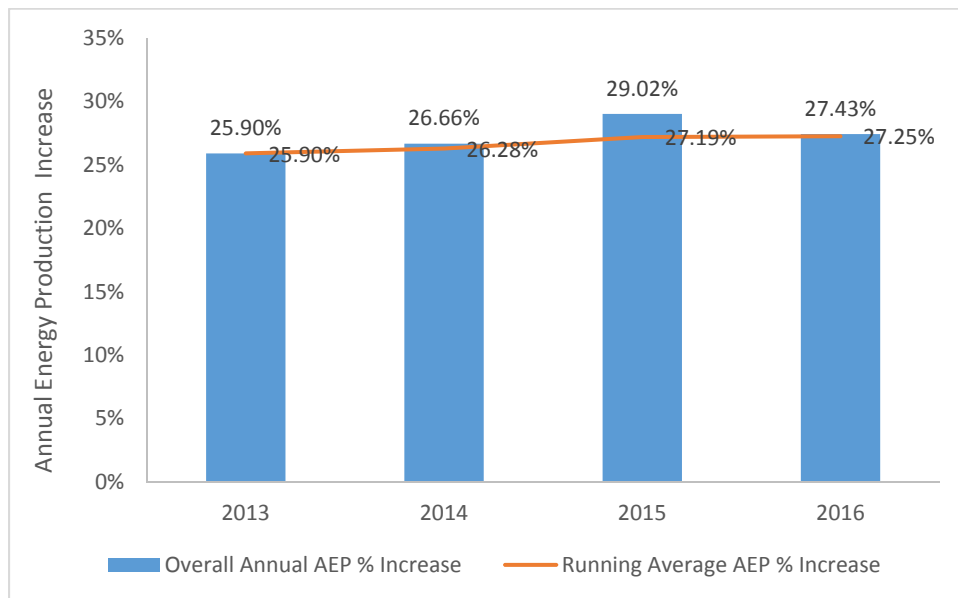
416 As shown in Table 2, the generation from this four-year period reflects a range
417 of year types from below-average winds to above-average winds. In all, the generation
418 from this 2013–2016 period reflects 98.7 percent of the long-term average generation
419 from the facilities, indicating the energy production estimates developed from this
420 period should be representative of those expected over the long term.

421 **Table 2: Existing Wind Project Generation by Year**

Year	Annual Generation (MWh)	% of Long Term Avg. Generation
2013	3,002,312	104.6%
2014	2,936,207	102.3%
2015	2,508,055	87.4%
2016	2,878,792	100.3%
2013-2016 Average	2,831,341	98.7%
Existing Long Term Average Generation	2,869,016	

422 Additionally, the operational regime of the wind projects in this recent history
423 is most representative of current facility operations, as compared to earlier years. For
424 example, the first full year of operational curtailments to address avian impacts began
425 in 2013 at Seven Mile Hill I, Seven Mile Hill II, Glenrock I, Glenrock III and Rolling
426 Hills. Further, the Company joined the California Independent System Operator
427 (“CAISO”) energy imbalance market (“EIM”) on November 1, 2014, which has
428 impacted the economic dispatch of the Company’s wind projects relative to the
429 marginal cost of other resources in the EIM market. Finally, Figure 1 also shows that
430 there is very little inter-annual variability in the estimated overall annual energy
431 production increase associated with repowering. That is, the annual energy production
432 increase is relatively insensitive to the number of years of data used to generate the
433 estimate.

434 **Figure 1: Variability in Annual Energy Production (“AEP”) Increase by Year**



435 **Q. Mr. Peaco faults the Company for not separately analyzing the economic benefits**
436 **of repowering only turbines that are likely to experience failed components.**
437 **(Peaco Resp., lines 445–448.) Can you explain why the Company has not prepared**
438 **this analysis?**

439 A. First, the analysis Mr. Peaco suggests presents many challenges as it would be
440 inconsistent with negotiated contracts with turbine suppliers to repower all turbines at
441 its facilities that can be repowered and qualify for PTCs.

442 Second, repowering certain turbines but not others at the project sites would
443 implicate the service and maintenance agreements that have been negotiated for these
444 sites.

445 Third, for project sites [REDACTED]
446 [REDACTED]
447 [REDACTED]
448 [REDACTED]
449 [REDACTED]
450 [REDACTED]
451 [REDACTED]
452 [REDACTED].

453 Fourth, repowering only certain turbines at a facility—and retiring the turbines
454 not repowered earlier than those that are repowered—may impact the land rights under
455 which the facilities operate. The landowners may consider early decommissioning of
456 some turbines and not others on their property as a breach of the lease agreements
457 because it frustrates their purpose in the wind energy lease to maximize royalty

458 payments from wind energy production.

459 Fifth, at the end of the useful lives of the original equipment that is not
460 repowered, it would also be more challenging—and perhaps infeasible—to repower the
461 site because some turbine locations would continue generating for another 10 years,
462 while others would cease operation. Given the larger size of modern turbine rotors and
463 the greater spacing required between them, it would not be easy to integrate newer
464 turbines into the projects. Because of these unknowns—and unknown costs even if
465 these issues could be overcome—it would be pure speculation to develop an estimate
466 of the costs and benefits of selectively repowered turbines over a new 30-year asset life
467 as Mr. Peaco describes.

468 **Q. Are there problems with Mr. Peaco’s analysis in which he attempts to evaluate**
469 **repowering benefits that may be attained by focusing only on turbines that would**
470 **experience the most avoided capital expenditure if repowered?**

471 A. Yes. Mr. Peaco’s analysis ignores the fundamental nature of the optimization model
472 used to support the Company’s analysis by simplifying the results and parsing them in
473 a static spreadsheet. Mr. Peaco’s analysis comparing the economics of repowering
474 turbines with impacted and non-impacted gearboxes at the Seven Mile Hill I and
475 Leaning Juniper facilities does not acknowledge the fact that by altering the number of
476 turbines repowered at a facility, the capacity factor, shape, total nameplate capacity,
477 and generation output of the repowered facility also change.

478 **Q. Mr. Peaco states that many of the “projects and turbines included in the**
479 **repowering proposal do not have potential to deliver high likelihood of benefits.”**

480 **(Peaco Resp., lines 535–537.) Do you agree?**

481 A. No. Mr. Peaco performed an analysis looking at only two facilities (Seven Mile Hill I
482 and Leaning Juniper) to attempt to determine the relative benefits of repowering
483 turbines that had impacted gearboxes. The analysis evaluated those facilities under the
484 most conservative of nine price-policy scenarios in which the benefits of repowering
485 would be the lowest. Additionally, the analysis did not demonstrate that repowering
486 non-impacted gearboxes was not economic, only that repowering turbines facing
487 expenditures to address an impacted gearbox is more favorable, as would be expected.
488 The Company’s analysis shows that repowering all turbines, including those that do not
489 have a problem gearbox, creates net benefits.

490 **Q. Mr. Peaco recommends the Company consider a revised program proposal that**
491 **eliminates at least six of what he believes are the least attractive sites and limits**
492 **the repowering to those turbines that have problematic gearbox equipment.**
493 **(Peaco Resp., lines 670–690). Do you agree with this recommendation?**

494 A. No. Reducing the scope of the repowering projects would deny customers the full net
495 benefits of the project. Although the different projects offer varying levels of net
496 benefits, they all still provide a net benefit, nevertheless. Furthermore, the analysis
497 provided by Mr. Peaco does not demonstrate that it is uneconomic to repower the
498 turbines with non-impacted gearboxes.

PROJECT NEED

499

500 **Q. Dr. Zenger states that “considering the risk that the Company is asking ratepayers**
501 **to bear, the short- and long-term impacts, and the fact that the new equipment is**
502 **not needed for reliability or other purposes, the Division continues to find that the**
503 **Company’s proposal to repower is not prudent or in the public interest.” (Zenger**
504 **Resp., lines 71–74.) Do you agree with this assessment?**

505 A. No. As outlined above and in my earlier testimony, the risks of the repowering project
506 are clearly outweighed by the net benefits to customers. In addition, I fundamentally
507 disagree that the new equipment is not needed for reliability purposes. My direct
508 testimony spoke of the enhanced ability of the repowering turbines to provide voltage
509 and inertial support to the transmission system in Wyoming. The Company has also
510 provided studies to parties through discovery indicating a need for additional reactive
511 power on the Company’s transmission system that will be provided by the repowered
512 facilities. Finally, as described by Mr. Link, the repowering project was included as a
513 fundamental element of the Company’s least-cost, least-risk resource portfolio in the
514 2017 IRP.

515 **Q. Does this conclude your supplemental rebuttal testimony?**

516 A. Yes.