BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

IN THE MATTER OF THE APPLICATION OF ROCKY MOUNTAIN POWER FOR APPROVAL OF A SINIFICANT ENERGY RESOURCE DECISION AND VOLUNTARY REQUEST FOR APPROVAL OF RESOURCE DECISION	))))))))))	**DOCKET NO. 17-035-40** **DPU Exhibit 2.0 Dir** **Testimony and Exhibits** **Daniel Peaco**

FOR THE DIVISION OF PUBLIC UTILITIES
DEPARTMENT OF COMMERCE
STATE OF UTAH

CONFIDENTIAL

Testimony of

Daniel Peaco

On Behalf of the Division of Public Utilities

December 5, 2017

CONFIDENTIAL-SUBJECT TO UTAH PUBLIC SERVICE COMMISSION RULES 746-1-602 and 603

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I. Introduction

Q. What is your name and business address?

A. My name is Daniel Peaco. I am employed by Daymark Energy Advisors, Inc. (Daymark) as a Principal Consultant. My business address is 48 Free Street, Portland, Maine 04101.

Q. On whose behalf are you testifying in this proceeding?

A. I am submitting testimony on behalf of the Utah Division of Public Utilities (Division) with regard to the Application for Approval of a Significant Energy Resource Decision and Voluntary Request for Approval of Resource Decision filed on June 30, 2017 (the "Application" or the "Filing") by Rocky Mountain Power ("RMP" or the "Company") with the Public Service Commission of Utah (the Commission) for approval of the Company's plan to construct new transmission facilities and integrate new incremental wind capacity. This matter has been designated as Docket No. 17-035-40.

Q. Please summarize your professional experience and qualifications.

A. I have more than 35 years of a broad set of policy, planning and decision support experience in electric power industry planning. With respect to the subject of this testimony, my consulting practice has included a number of engagements in which I have provided expert testimony related to energy, economic, and environmental assessments of proposed transmission and renewable energy projects.

I have been employed at Daymark since 1996 and currently serve as Chairman of our Board, a position I have held since 2002.

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Q. Have you previously testified before the Commission or other commissions?

A. I have filed written testimony in the Company's wind repowering Docket No. 17-035-39 that is currently before the Commission. I have testified on numerous occasions before a significant number of state and provincial regulatory commissions and siting authorities across the U.S. and Canada. My resume and a complete listing of my expert witness appearances are included in DPU Exhibit 2.1 DIR.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to examine the economics, reliability, and risks of the wind and transmission projects proposed by the Company. My testimony focuses on whether the proposed projects are likely to be lowest reasonable cost resources, whether the short-term and long-term impacts on Utah ratepayers are acceptable, and whether the resulting economic risks to Utah ratepayers are acceptable.

In particular, my testimony includes the following issues:

- Does the Company's analysis demonstrate that the projects will deliver cost-effective energy to Utah ratepayers?
- Is the Company's modeling analysis sound, and does it provide an accurate representation of the economic benefits of the projects to Utah ratepayers?
- Does the Company's analysis of the projects reasonably consider the uncertainties that have bearing on the risk to Utah ratepayers that the projects may not deliver cost-effective energy?

Q. What exhibits are you sponsoring?

A. I am sponsoring one Exhibit in this testimony; DPU Exhibit 2.1 DIR is my resume.

II. Summary of Conclusions

Q. Please summarize your conclusions and recommendations regarding the issues addressed in your testimony.

A. Based upon my review, I offer the following conclusions:

- The Company is proposing the Combined Projects as an opportunity for cost savings to ratepayers, based principally upon the value that the current tax law provides in the form of production tax credits (PTC). The Combined Projects are not required for reliability or other system needs.
- The Company's economic benefits analysis indicates that the Combined Projects do not provide a high likelihood of savings to ratepayers, as several cases presented show net costs or very limited net benefits.
- Since the Company completed its analysis prior to filing the Application on June 30, 2017, the Company has developed updated modeling assumptions (including load and fuel prices), and expects to update these assumptions again in early 2018. It is possible an analysis using updated assumptions will conclude lower benefits or more net costs to customers than the original Application.

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- The Company's proposal calls for substantial risks associated with the economic benefits to be borne by ratepayers. Those risks include potential changes in the federal corporate tax rate and/or PTC regulations and uncertainties regarding PTC qualification, project cost, and project schedule. These risk factors have not been sufficiently considered by the Company, and could have adverse consequences on ratepayers.
- The Company has not conducted sufficient studies to conclude that the proposed Transmission Projects will allow the full interconnection and delivery of the 1,270 megawatts (MW) of new wind capacity authorization requested by the Company. The Company recently submitted an October 2017 preliminary transmission study that offers limited analysis of this configuration.
- The Company's October 2017 preliminary transmission study does not provide clear support for the Company's ability to add the 1,180 MW of wind capacity included in the Application's economic analysis. Due to the late filing of the study, our review is not complete. However, it is clear that the plan requires a number of special protection schemes and system redispatches to accommodate this level of wind additions. Further, there is uncertainty regarding the outcome of the review of the proposed transfer capabilities in studies to be conducted by others over the next three years.

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Based upon these conclusions, I find that:

- The Company has not demonstrated that there is a high likelihood the proposed projects will yield net customer benefits. The analysis does not adequately identify and consider the potential adverse outcomes to ratepayers resulting from the proposal.
- The Company's transfer capability assessment is not sufficient to conclude that the proposed wind projects will be fully dispatchable.
- The Company's projects should not be considered for approval in this case unless and until the Company provides a new analysis, updated with the Company's most current system assumptions, that addresses the methodology problems I have identified, and fully and adequately addresses the full range of risks that the Company is asking its ratepayers to bear.
- The Company's filing in January will include many changes in assumptions and costs of the proposed wind projects. The economic analysis included in the application is likely not representative of the values that will be presented in January.

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III. The Company Has Not Demonstrated Lowest Reasonable Cost Energy Benefits

A. Wind and Transmission Projects Overview

Q. Please briefly describe RMP's proposal for the Wind and Transmission Projects.

A. The Company is proposing to develop a number of wind projects in eastern Wyoming and associated transmission projects to provide upgrades needed to integrate the wind energy production into the system. In total, the Company estimates the combined wind and transmission projects (Combined Projects) to be a $2 billion investment with a plan to have all facilities operational by the end of 2020 to realize full PTC benefits.[1]

Q. Please describe the specific Wind Projects included in RMP's proposal and the portion of the Combined Project costs that are attributable to those Wind Projects.

A. The Company's Application[2] proposes to construct or procure approximately 860 MW of wind in eastern Wyoming. The Company's Application includes four benchmark wind projects, totaling 860 MW, namely Ekola Flats (250 MW), TB Flats I (250 MW), TB Flats II (250 MW) and McFadden Ridge II (110 MW). These projects were developed to

[1] Direct Testimony of Cindy A. Crane, lines 21 – 23.
Cost and benefit figures cited in the Company's testimony represent total project costs and benefits. The allocation of cost to Utah is approximately 43 percent of those values. Throughout my testimony, values stated are values for the total project unless specifically noted otherwise.

[2] The Company filed its Application and the Direct Testimonies of Cindy A. Crane, Chad A. Teply, Rick A. Vail, Rick T. Link, and Jeffrey K. Larsen in this Docket on June 30, 2017.

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be benchmark resources in the 2017R Request for Proposals (RFP) and offered in the Application as proxy resources pending the outcome of that procurement process.[3]

The Company issued an RFP on September 27, 2017 calling for proposals from wind projects in Wyoming and at other locations to be submitted in October 2017.[4] It is currently evaluating the proposals received in response to that RFP.

The Company's estimated cost for the Wind Projects is approximately [redacted].[5]

Q. Please describe RMP's proposal for the Transmission Projects.

A. The Company's proposal include six Transmission Projects that, together, are designed to increase the transfer capability across southern Wyoming transmission system to accommodate the Wind Projects and 320 MW of Qualifying Facility (QF) wind projects that are under development in eastern Wyoming, a total of 1,180 MW of wind.[6] The projects feature a new, 140 mile 500 kV transmission line, two 500 kV substations, and a five mile 345 kV line and associated modifications to an existing 345 kV substation. In addition, the Company will be upgrading the existing 230 kV system, adding a new 16 mile, 230 kV line and associated substation modifications, and rebuilding four miles of an existing 230 kV line and associated substation modifications. Lastly, the Company is proposing a voltage control device.[7]

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3 Direct Testimony of Cindy A. Crane, lines 81 – 83.
4 http://www.pacificorp.com/sup/rfps/2017-rfp.html
5 Direct Testimony of Chad A. Teply, line 93.
6 Id. at lines 101 – 107.
7 Direct Testimony of Rick A. Vail, lines 27 – 48.

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The Company has estimated the cost of the Aeolus-to-Bridger/Anticline Line components to be approximately [redacted] and the cost of the 230 kV upgrades to be [redacted], for a total of [redacted].[8]

Q. Why is the Company proposing the Combined Projects?

A. The Company indicates that the Combined Projects are offered to take advantage of the economic opportunity afforded by federal PTC and corporate tax rate policy.[9] Ms. Crane states that the PTC policy "*... has created a unique, time-limited opportunity for the Company to construct critical transmission facilities in eastern Wyoming, while providing substantial customer savings.*"[10]

Q. What is the basis for Ms. Crane's characterization of the transmission facilities as critical?

A. Ms. Crane indicates that the Transmission Projects are a sub-segment of the Company's Energy Gateway West transmission project, which the Company has been pursuing since 2008. She asserts that the Transmission Projects will relieve congestion on the current system, provide critical voltage support, provide a number of reliability benefits, and increase transfer capability.[11]

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8 Direct Testimony of Rick A. Vail, lines 282 – 289.

9 At this writing, the federal tax policy forming the basis for the Application is subject to change as the House of Representatives and the Senate have each recently passed versions of the *Tax Cuts and Jobs Act*. If enacted into law, either version would alter certain elements of this policy affecting the economic analysis of the Combined Projects. See further discussion in Section VI below.

10 Direct Testimony of Cindy A. Crane, lines 206 – 210.

11 Id., lines 56 – 67.

Q. Do you agree with that characterization?

No, I do not.

The need for these Transmission Projects is based entirely on an opportunity for economic benefits. The Company has confirmed that the existing system meets NERC standards and that there is no reliability-based need for system upgrades in this part of the transmission system if the Wind Projects are not built.[12] Ms. Crane and Mr. Vail each acknowledge that the Transmission Projects are not economic without the Wind Projects and the associated PTC benefits.[13]

B. The Company's Assessment of Economic Benefits

Q. How has the Company represented the benefits of the Combined Projects?

A. Ms. Crane describes the Combined Projects as an exciting opportunity for ratepayers, indicating that she expects ratepayers to realize approximately $137 million in benefits over time (through 2050) from the approximately $2 billion investment.[14] She also indicates that the Combined Projects are interdependent and not separable, as the Transmission Projects are not economic without concurrent addition of the Wind Projects.[15]

[12] RMP Response to Data Request DPU 8.1. Direct Testimony of Rick A. Vail, lines 431 – 432.
[13] Direct Testimony of Cindy A. Crane, lines 202 – 205. Direct Testimony of Rick A. Vail, lines 56 – 71.
[14] Direct Testimony of Cindy A. Crane, lines 21 – 29 and 247.
[15] Id. at lines 200 – 210.

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Ms. Crane describes three types of benefits attributable to the Transmission Projects: 1) relieving congestion in the transmission system in eastern Wyoming to allow new resources to interconnect to the system; 2) increasing the transfer capability of the system (east to west) by 750 MW; and 3) allowing up to 1,270 MW of incremental wind resources to be added in eastern Wyoming.[16]

Q. How do the benefits described by Ms. Crane relate to the $137 million in economic benefits that she expects customers to realize?

A. First, it is important to make clear that the Combined Projects are, in fact, one project. None of the Wind Projects are feasible without upgrades to the transmission system and none of the Transmission Projects are necessary without a decision to add new wind projects. Each of the three benefits Ms. Crane attributes to the Transmission Projects are directly related to enabling new wind projects to be built.

The economic benefits the Company expects are based on an evaluation of all of the Combined Projects being developed concurrently with full completion by the end of 2020 to gain maximum PTC benefits, under current tax law, from the Wind Projects.

Q. How has the Company derived its estimate of the benefits of the Combined Projects?

A. The Company has conducted analysis of the Combined Projects over two different study periods (20 and 30 years), and has presented benefits calculations in several ways using

[16] Id. at lines 153 – 174.

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multiple models. The Company has provided these benefits across nine price-policy scenarios, consisting of three natural gas price scenarios and three CO_2 price scenarios consisting of low, medium and high values for each variable.

First, the Company has presented results using the same modeling tools and methods used in the Integrated Resource Plan (IRP) analysis to evaluate system portfolios over a 20-year planning period (2017-2036).[17] Consistent with the IRP analysis, the Company conducted this analysis using the System Optimizer (SO) model, as well as the Planning and Risk (PaR) model.

The SO model is primarily used to develop long-term resource portfolios to meet a target planning reserve margin. The model selects capacity resources to produce a least-cost resource portfolio given a defined set of assumptions. The primary output of the SO model is a schedule of capacity resource additions, but the Company has also used the output to calculate benefits of the Combined Projects in terms of reduction in the present value of revenue requirements (PVRR).[18]

The PaR model uses the resource portfolio output from the SO model to perform more detailed system dispatch modeling, accounting for needed operating reserves and incorporating uncertainty with the use of stochastic variables.[19] The PaR analysis of each

[17] Direct Testimony of Rick Link, lines 368 – 372.
[18] Id. at lines 385 – 392.
[19] The variables treated stochastically are load, wholesale electricity and natural gas prices, hydro generation, and thermal unit outages. Id. at lines 402 – 403.

price-policy scenario reports a distribution of values with the primary reported value being the mean resulting PVRR over the 20-year planning period.[20]

In addition to the stochastic mean results, the Company has calculated "risk-adjusted PVRR" results. According to the Company, the "risk-adjusted PVRR is calculated by adding five percent of system variable costs, from the 95th percentile of the distribution of system variable costs, to the stochastic-mean PVRR."[21]

These 20-year analyses include levelized capital revenue requirements "to avoid potential distortions in the economic analysis of capital-intensive assets that have different lives and in-service dates."[22]

Q. Please describe the 30-year analysis conducted by the Company.

A. The second benefits analysis conducted by the Company is a 30-year annual revenue requirement analysis.[23] This analysis extends beyond the 20-year period considered in the IRP (2017-2036) through 2050, covering the entire depreciable life of the wind projects under the assumption that the wind projects have a 30-year economic life.

The Company's 30-year analysis uses nominal annual values for the capital revenue requirements, rather than the levelized capital revenue requirement values used in the 20-year analysis discussed above. This 30-year analysis uses an extrapolation method to

[20] Id. at lines 398 – 413.
[21] Id. at lines 446 – 448.
[22] Id. at lines 606 – 611.
[23] See Id. at lines 660 – 664. Note that the analysis extends to 2050 in order to capture the full 30-year depreciable life of all of the Wind Projects. Therefore, the analysis extends from 2017-2050, a period of 33 years. In this testimony I will refer to this as the "30-year" analysis.

extend the 20-year PaR analysis, meaning the values for years 2037-2050 are not developed in the same manner as the values for years 2017-2036. The SO and PaR analyses only extend through 2036, with extrapolated values being used for the years 2037 – 2050.

The Company's economic analysis includes a portion of the estimated cost of the Transmission Projects and the estimated cost and production from 1,180 MW of wind from the 860 MW associated with the Wind Projects and 320 MW of QF wind projects.[24] The Company has assumed a 62-year life for the Transmission Projects and has included only that portion of the costs expected to be recovered through 2050. Therefore, the costs that customers will incur between 2051 and 2082 are not included in the economic analysis.[25]

Q. What are the benefits for ratepayers estimated by the Company under the various methods?

A. Based on the 20-year analyses, the Company provided ranges of benefits across the nine scenarios. For the SO model analysis, the scenarios results ranged from a net cost to customers of $121 million (Low Gas, Zero CO_2) to a net benefit of $396 million (High Gas, High CO_2). For the PaR model analysis, the stochastic mean results ranged from a net cost to customers of $77 million (Low Gas, Zero CO_2) to a net benefit of $409 million (High Gas, High CO_2). For the PaR model analysis, the risk-adjusted PVRR results

[24] Id. at lines 502 – 506.
[25] RMP Response to Data Request OCS 5.1.

ranged from a net cost to customers of $74 million (Low Gas, Zero CO_2) to a net benefit of $437 million (High Gas, High CO_2).[26] The Combined Projects were shown to have positive benefits in seven of the nine scenarios with net cost to ratepayers in two of the scenarios.

The Company's 30-year economic analysis of the Combined Projects shows a range of benefits in nine cases with combinations of natural gas price and CO_2 price forecasts. The scenarios' results ranged from a net cost to customers of $174 million (Low Gas, Zero CO_2) to a net benefit of $595 million (High Gas, High CO_2).[27] As was the case in the 20-year analysis, the Combined Projects were shown to have positive benefits in seven of the nine scenarios with net cost to ratepayers in two of the scenarios.

Q. How do these benefit levels compare to the costs of the Combined Projects?

A. The Company has estimated the cost of the Combined Projects to be $2 billion and based its economic analysis on a net present value (NPV) of incremental revenue requirements over the 30-year life of the Wind Projects and the first 30-years of the revenue requirements for the Transmission Projects. That revenue requirements NPV is [redacted].[28]

[26] Direct Testimony of Rick Link, Table 2 (p. 36).
[27] Id. at Table 3 (p. 38).
[28] See, e.g. Link Testimony Workpaper "Gateway Results Direct Testimony.xlsm", Price-Policy Annual – PaR worksheet, cells D88:D92 for [redacted] for the projects expressed in terms of present value. These values are the difference in costs between the status quo case and the project case and therefore represent the costs.

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The benefits to customers that the Company has estimated, compared to those project costs, vary depending on whether the analysis period is 20 years or is extended to cover the assumed 30-year life of the assets. The 20-year PaR stochastic mean analysis, for example, includes two cases where the benefits are less than the costs (ranging from 1 percent to 6 percent loss) and, for those cases with positive benefits, the benefits range from 1 percent to 20 percent of the investment cost of $2 billion. The Company's 30-year analysis also includes two cases where the benefits are less than the costs (5 percent and 9 percent loss) and, for those cases with positive benefits, the analysis shows the values ranging from a low of 3 percent of investment cost to a high of 30 percent in the case with high natural gas and carbon emissions pricing.[29]

Q. How does the Company benefit if the Combined Projects are approved?

A. The Company's proposal, as reflected in its analysis, provides a regulated return on its investments, based on an assumed approved rate of return. With this Application, the Company seeks to obtain assurances that the Commission will provide it the opportunity to earn that return on these added investments.

Q. What is the magnitude of the return on investment for the project as proposed?

A. According to the workpapers provided by the Company, the NPV of the Transmission Projects' capital recovery portion of the total project costs is [redacted]

[29] Values calculated based on Direct Testimony of Rick Link, Tables 2 (p. 36) and 3 (p. 38).

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[redacted].[30] [redacted]

[redacted]

[redacted][31]

If the Company builds the benchmark wind projects, rather than selecting third party projects through the RFP, it will also earn a return on those investments. The Company has not provided workpapers sufficient to calculate the forecasted return on investment from those projects.

Q. Is the Company's return under its proposal dependent on the level of benefits realized by the Combined Projects?

A. No it is not. Under the proposal, the Company would recover the cost of the project plus a return on investment, regardless of whether or not benefits materialize.

Q. How does the Company's analysis of benefits relate to Ms. Crane's testimony?

A. Ms. Crane's expectation of the savings to ratepayers is based on the Company's results in the Medium Gas, Medium CO_2 scenario from the 30-year analysis, with the savings to ratepayers in that scenario being $137 million.[32]

[30] See, e.g. Link Testimony Workpaper "Gateway Results Direct Testimony.xlsm", Price-Policy Annual – PaR worksheet, cell D88.
[31] See Link Testimony Workpapers, "Energy Gateway GM 2017 03 13 w Bonus.xlsm", line 1696.
[32] Direct Testimony of Cindy A. Crane, line 247; Direct Testimony of Rick Link, Table 3, page 38.

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Q. Do you agree with Ms. Crane's interpretation of the Company's analysis?

A. No, I do not. Her focus on the results from the Medium Gas, Medium CO_2 scenario overlooks the real possibility that ratepayers would, under the Company's analysis, see benefits that are much less than this amount and even see net costs.

Further, Ms. Crane's reliance on this value does not provide a high likelihood that the projects will be beneficial to ratepayers, a standard she articulates in her recent testimony presented in support of the Company's wind repowering projects.[33]

This proposal has been offered as a unique opportunity for the Company to develop the Combined Projects to provide cost savings to ratepayers. However, there is no resource need for these projects; they do not serve to address any identified need from a reliability or public policy requirement.

Resource decisions, based on resource planning, are typically framed as a choice among alternative resource options or paths to meet identified need. In this case, the only alternative to the Combined Projects is to not pursue them.[34] There is no need to act to meet a resource need, only to act if there is a high likelihood that the Combined Projects will be beneficial to ratepayers.

[33] Rebuttal Testimony of Cindy A. Crane, Docket No. 17-035-39, lines 56 – 58.

[34] The Company has also proposed wind repowering projects and presented with and without economic analysis for the repowering projects, the Combined Projects and sensitivity tests with the two project combined in its Energy Vision 2020 Informational filing, August 2, 2017.

In the context of this case, a 50/50 proposition is not acceptable. A much higher probability of benefits to ratepayers should be established. The Combined Projects should be sufficiently robust to be beneficial across the full possible range of market and policy outcomes.

Q. Do you agree with the Company's position that this analysis demonstrates that the projects will save customers money and that the projects will deliver cost-effective energy to Utah customers?

A. No, I do not.

Even if you accept the results of the analysis as reasonable and complete, which I do not, these results do not provide assurance that ratepayers will have a high likelihood of realizing cost savings commensurate with the size of the investment. The Company's own analysis shows that there is uncertainty as to whether the projects, in the aggregate, are lowest reasonable cost resources.

In the 20-year and 30-year analyses, the SO and PaR results provide that two of the nine cases results in net costs to ratepayers (Low Gas, Zero CO_2 and Low Gas, Medium CO_2).[35]

The low end of the range of the outcomes presented by the Company in the 30-year analysis is a net cost of $174 million. Even the Medium Gas, Medium CO_2 case shows a

[35] Direct Testimony of Rick Link, Table 2 (p. 36).

net savings of only $53 million, or less than 3 percent of the original investment.[36] These are very modest savings for a long-term investment designed purely to save customers money. Only those cases that have high natural gas prices and high carbon pricing produce savings for customers comparable to the return on investment that the Company assumes it will receive under any of the assumptions in the nine scenarios, outcomes that are possible but are unlikely. There is very little certainty that customers will see significant, if any, cost savings from these projects. The Company's own analysis of the projects shows that the Company will see much higher benefits from these projects than will the Company's ratepayers.

Finally, I have significant concerns regarding the Company's analysis with respect to methodology and consideration of risks to ratepayers. The Company's analysis of the Combined Projects does not consider the full risks that customers would bear and the Company's methodology has a number of problems.

[36] Direct Testimony of Rick Link, Table 3 (p. 38).

IV. The Company's Economic Modeling Does Not Provide Reasonable Results

Q. Please describe the nature of your concerns with the results of the Company's economic modeling analysis.

A. I have several concerns with the Company's analysis. First, the analysis does not reflect the Company's current assumptions and therefore does not provide the best information regarding the potential impact of the project on Utah ratepayers. Second, the study period used by the Company includes only the first half of the period over which the transmission costs will be recovered, potentially distorting the net benefits results. Third, the method used by the Company to extrapolate costs and benefits beyond 2036 may not provide a reasonable estimate of the impact of the Combined Projects. Lastly, the Company did not consider sufficient alternatives for the transmission or wind components of the Combined Projects.

Q. Please describe your concern with respect to the Company's current assumptions.

A. The Company's analysis, which I discussed above, was provided in its Direct Testimony filed on June 30th of this year. In rebuttal testimony for the simultaneously filed Wind Repowering Docket, the Company updated a number of its planning assumptions, including the load forecast and price inputs.[37] The Company has not provided any similar

[37] Rebuttal Testimony of Rick T. Link, Docket No. 2017-035-39, lines 108 – 122.

updates to the analysis in this proceeding. Further, the Company has indicated it has not yet conducted the updated analysis and intends to include the updates in its scheduled supplemental filing in mid-January 2018.[38]

The updates included in the Company's Rebuttal Testimony in the Wind Repowering docket showed a material impact on the results.[39] The analysis of the Combined Projects would clearly change with the updates, as well. The analysis in the Company's Direct Testimony are, at best, preliminary estimates of the values that will be used in the final determinations in this proceeding.

As described in my testimony in the Wind Repowering case, the natural gas price forecasts for each of the scenarios are materially different from the forecasts used by the Company in June.[40] The Company updated the natural gas prices in the Medium Gas scenario, thus the changes shown in that case do not constitute a complete update of the nine price-policy scenarios. The Company's updated load forecast is lower than the values used in June.

Given the number of changes in the analysis that will be provided in January, including the baseline planning assumptions and project-specific inputs resulting from the evaluation of RFP bids, the specific results from the analysis currently in the record will likely differ materially from the analysis to be filed in January.

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38 Company Response to DPU Data Request 9.1, November 21, 2017.
39 Surrebuttal Testimony of Daniel Peaco, Docket No. 2017-035-39, lines 323 – 338.
40 Id., lines 288 – 292.

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Q. What is your concern regarding the discrepancy between the study period and the cost recovery period?

A. As I have previously discussed, the Company has evaluated the benefits of the Combined Projects over 20-year and 30-year periods. These analyses include annual costs and benefits of the Combined Projects. The Wind Projects are assumed to have a 30-year life, so the analysis captures the full costs and benefits of these projects. However, the Company is proposing to recover the costs of the Transmission Projects over 62 years. Therefore, the final 32 years of cost recovery is not included in the cost portion of the Company's analysis. The Company acknowledges this discrepancy, but explains that while it has not included the costs of the project, it also has not included any incremental benefits that the transmission could bring after 2050, such as allowing interconnection of new wind or other generation.[41] However, these benefits are uncertain, and the Company has provided no analysis or documentation to attempt to quantify them. The costs to ratepayers during this period, on the other hand, are certain and should be included in the economic analysis.

Q. What are your concerns with the extrapolation methodology used by the Company in the 30-year analysis?

A. As noted above, the extrapolation method uses system cost and benefits results from the 2028-2036 portion of the 20-year analysis. The Company used this period because it

[41] RMP Response to Data Request OCS 5.1.

immediately follows the retirement of the Dave Johnston coal plant.[42] The extrapolation period, therefore, assumes that the conditions over this eight-year period will persist through the end of the study period. This method can yield results that are problematic due to the timing of new resource additions in either the status quo or project case. The Company has not provided a justification for using this method, rather than extending the modeling period through the end of the study period.

Q. Did the Company consider any alternatives to the Transmission Projects?

A. No, it did not. The Company indicated that it is proposing the Transmission Projects because it is a sub-segment of the Energy Gateway master plan and, as a result, did not consider alternatives such as 345 kV alternatives.[43]

Q. What is the status of the rest of the projects in the Energy Gateway master plan?

A. The Company included the Transmission Projects in its 2017 IRP and is seeking acknowledgement of the Transmission Projects in the IRP proceeding.[44] With respect to the other segments of the master plan that have yet to be constructed, the Company has indicated that while it considers it prudent to continue permitting activities for those projects. However, the Company is not currently seeking acknowledgement for those projects and intends to submit cost-benefit analysis for those projects in a future IRP.[45]

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[42] Direct Testimony of Rick Link, lines 665 – 676.
[43] RMP Response to Data Request DPU 10.20(c).
[44] 2017 IRP, pages 61 – 63.
[45] Id., pages 63 – 65.

Q. What are the implications for the Company's Application in this proceeding?

A. The Transmission Projects are being proposed with the presumption that the balance of the Energy Gateway projects will ultimately also be developed. The Transmission Projects attributes were determined in the Energy Gateway master plan and were not specifically designed to determine the most cost-effective way to integrate the proposed Wind Projects. Given the lack of any information on alternatives to the Transmission Projects, I cannot determine whether the Transmission Projects are the lowest reasonable cost resource.

Q. Did the Company evaluate alternatives to the Wind Projects?

A. The Company's Application includes the 1,180 MW Wind Projects in its economic analysis. The only alternative sizing of the Wind Projects evaluated was a 1,100 MW configuration included in the Company's IRP.[46] The Company has not evaluated the economics of the 1,100 MW, the 1,270 MW maximum authorization amount included in the Application, or any other lower amount of Wind Energy development in the current application.[47]

Q. What are the implications for the Company's Application in this proceeding?

A. At this juncture, the analysis of alternative Wind Projects configurations would be informative to test the sensitivity of the economics of the Combined Projects. Of course,

[46] RMP Response to Data Request DPU 10.17 (a).
[47] RMP Response to Data Request DPU 10.17 (b) – (d).

the Company will be filing a new case with a set of wind projects resulting from the 2017R RFP in January. However, in light of the lack of alternatives to the Transmission Projects, the question becomes one of how much wind is necessary to make the Combined Projects economic and the ultimate feasibility of the Transmission Projects to reasonably integrate that amount of wind.

Q. Please summarize your concerns with the Company's modeling assumptions and methodology.

A. I believe that the assumptions and methods being used by the Company do not present a complete and accurate representation of the potential costs and benefits of the projects. In the Company's supplemental filing, I recommend that the analysis be updated with the most current assumptions regarding load, fuel prices, etc. I also recommend that the Company address my concerns regarding the transmission cost recovery over 62 years, and provide a calculation of the net benefits of the project including the NPV of the cost recovery of the project over the full period. Given my concerns with the extrapolation method, I recommend that the Company use the SO and PaR model for the full 30-year evaluation period, rather than use the extrapolation method. Finally, I do not believe the Company has sufficiently evaluated alternatives to the wind or transmission components of the Combined Projects to conclude that the proposal represents an optimal project.

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V. The Company's Transmission Studies Do Not Support Its Application

Q. Please describe the Company's testimony on the added capability to integrate wind energy projects enabled by the Transmission Projects.

A. The Direct Testimony of Rick Vail explains that congestion on the existing transmission system prevents the interconnection of additional wind generation. According to Mr. Vail, the Transmission Projects will increase the transfer capability across Wyoming from east to west by 750 MW, allowing the interconnection of up to 1,270 MW of incremental wind capacity.[48]

Q. What evidence has the Company provided in support of these conclusions?

A. In response to initial data requests seeking studies supporting the claimed 750 MW increase in transfer limit and supporting the ability to interconnect up to 1,270 MW of new wind, the Company provided a 2010 WECC path rating study which evaluated the full Energy Gateway West project, and did not isolate the effect of the Transmission Projects proposed in this docket.[49] During the October 11, 2017 technical conference, the Company confirmed that this study did not, in fact, support the claimed 750 MW increase, and that the Company had not yet provided analysis concluding that the transfer limit would increase by 750 MW. On October 20, 2017, the Company provided a new

[48] Direct Testimony of Rick Vail, lines 72 – 79.
[49] See RMP Response to Data Requests OCS 1.19 and OCS 1.23.

analysis to support its conclusions regarding transfer limit, the *Aeolus West Transmission Path Transfer Capability Assessment, Preliminary Study Report*.[50]

Q. Please describe the Company's study.

A. The purpose of the study is evaluate the transfer capability of the Aeolus West transfer path after the Transmission Projects are constructed. The Aeolus West path consists of four transmission elements,[51] and the transfer capability is the total flow that can simultaneously move over the lines in one direction, given a certain set of system conditions. Figure 1 provides a simplified system schematic of the key elements, with the Aeolus to Anticline segment being the proposed 500 kV transmission line adding capability to the existing 230 kV system.

[50] RMP Response to Data Request OCS 8.1.

[51] The four elements are: Aeolus – Anticline 500 kV, Platte – Latham 230 kV, Mustang – Bridger 230 kV, Riverton – Wyopo 230 kV transmission lines.

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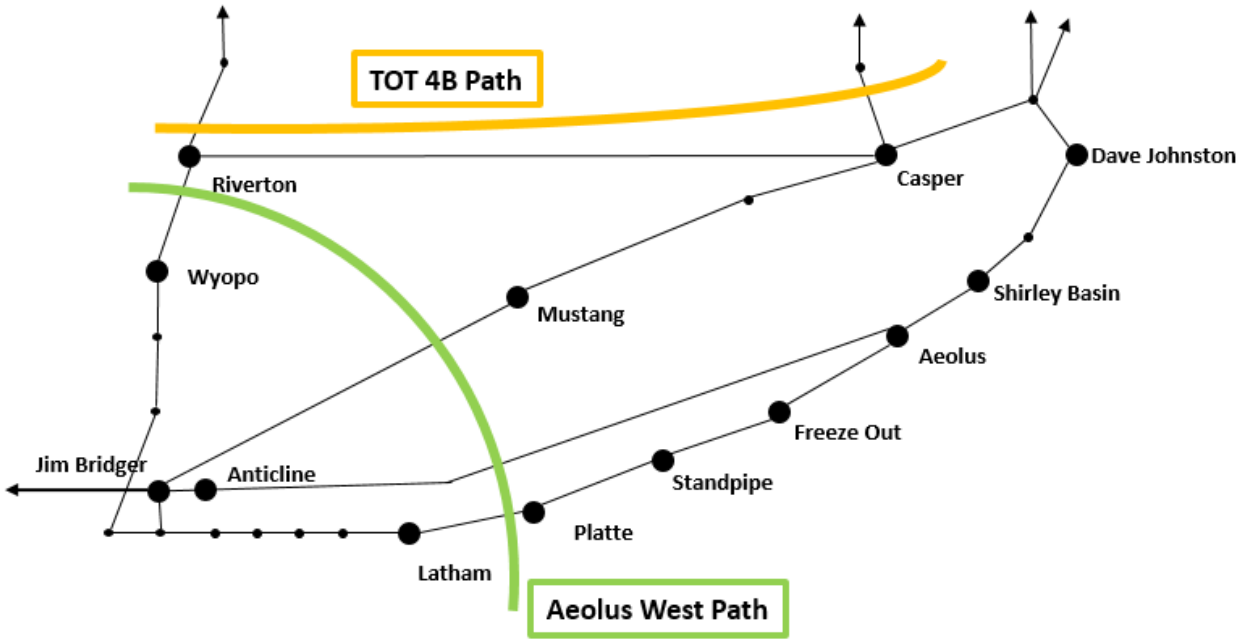

Figure 1. Simplified system diagram

The study is based on a power flow model that includes a detailed representation of load, generation, and transmission assets. The analysis includes power flow and dynamic stability study findings resulting from the evaluation of the system after the addition of the transmission upgrades and 1,169 MW of new wind capacity. The objective of the study was to determine the amount of energy that can flow west over the Aeolus West path under various conditions while maintaining system reliability and stability in accordance with applicable planning criteria. The Company's study focused on the simultaneous interaction of flow over the Aeolus West path with the flow over the nearby TOT 4B path (see Figure 1).

The study concludes that with the addition of 1,169 MW of wind, a total of 1,696 MW can flow over the Aeolus West path while maintaining a secure system, subject to the

requirement to use special operational protocols known as Remedial Action Schemes (RAS). At a high level, RAS are predefined operational measures (such as tripping generation) that will be taken during certain operational situations or system contingencies in order to maintain system security. In this study, the Company found that there are RAS required if any of three specific line segments experience an outage. Finally, the study tests a single-case sensitivity of integrating 1,270 MW of incremental wind with similar results, also requiring the use of RAS.

Q. What is the primary significance of the study in the context of the Company's Application?

A. The importance of the study to the Application is that the Company uses it as evidence that if the Transmission Projects are built, the transfer limit between eastern Wyoming (where the Company proposes to build the new wind) and western Wyoming (towards the load centers to the west) will increase by 750 MW. According to the Company, this increase in transfer capability, coupled with redispatch of thermal generation, provides sufficient transmission capability to interconnect the Wind Projects and allow them to be fully dispatchable and able to deliver energy to load in the west. This level of wind energy development is critical to the Company's determination of the Combined Projects' economic benefits.

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Q. Please explain how the study examines simultaneous interaction between the Aeolus West path and the TOT 4B path.

A. Due to infrastructure constraints, there is a tradeoff between flowing energy from the east to the west over Aeolus West and flowing energy across the TOT 4B path. The study tested several levels of flow to characterize the interaction of these paths. Figure 2 below is the nomogram depicting this tradeoff in flow.[52]

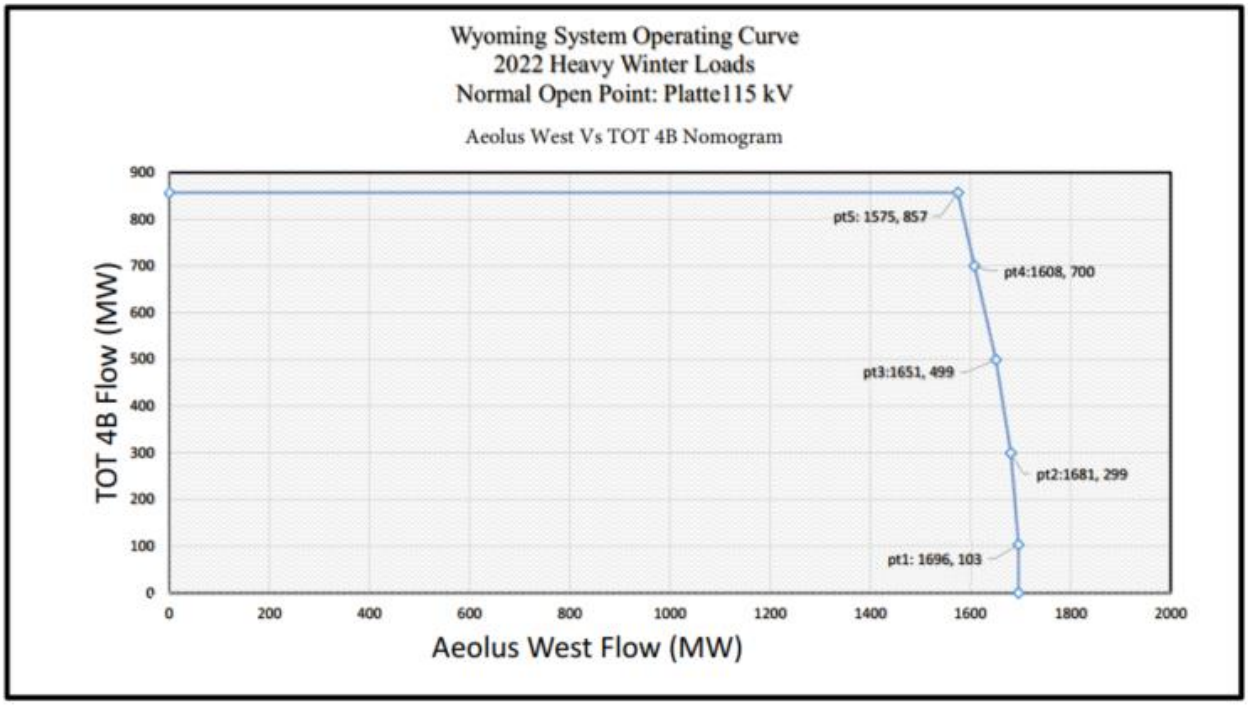

Figure 2. Aeolus West v. TOT 4B nomogram

This figure shows that when the TOT 4B path is flowing at its maximum flow of 857 MW, the Aeolus West path flow is limited to 1,575 MW. As the Aeolus West flow is

[52] Attachment to the Company's Response to OCS 8.1. *Aeolus West Transmission Path Transfer Capability Assessment, Preliminary Study Report*, October 2017, Appendix C.

increased above 1,575 MW, the TOT 4B path must be reduced. The final point on the graph shows an Aeolus West path flow of 1,696 MW and a TOT 4B path flow of 103 MW. This is important to note, because the study found that the 1,696 MW flow is the level required to allow the integration of 1,169 MW of new wind.

Q. Please explain the significance of the reliance on RAS.

A. The study identified RAS that would be needed for three different line outages. The most significant RAS relates to the outage of any element of the new transmission connection between Aeolus and Jim Bridger, including the 500 kV line, the 500/230 kV transformer, the 500/345 kV transformer, and the new 345 kV line to Jim Bridger. If any component were to experience an outage under the conditions tested in the study, the RAS calls for 640 MW of the operating wind generation to be rapidly transfer-tripped in order to maintain system reliability.

The addition of the Transmission Projects creates a new, much larger first contingency for the system elements that define the Aeolus West path. Without the RAS, the transfer capability on that path is increased by 110 MW. With the RAS (tripping of 640 MW of wind production when the 500 kV path is lost), the effective transfer limit is increased by 750 MW.

Two other required RAS involving smaller amounts of tripped generation were also identified in the study for outages on the Aeolus – Freezeout 230 kV and Aeolus – Shirley Basin 230 kV transmission lines.

Q. Please describe your concerns regarding the Company's transmission planning analysis of the Transmission Projects.

A. I have several concerns with the studies provided by the Company so far:

- The transfer capability study assumptions and methods are problematic.
- As reported, the results of the transfer capability study do not support the integration of 1,270 MW as requested by the Company without modification to the proposal or significant operational limitations.
- The transfer capability study is preliminary, and the actual path transfer limit approved by WECC will not be known until after the wind projects will be under construction.

These issues ultimately represent risks to customers that may reduce any benefits of the Combined Projects or potentially impose net costs to customers.

Q. What are your concerns related to the study assumptions and methods?

A. First, I want to note that my review of the study is still ongoing. The Company provided the study only recently, and the Company has just issued responses to data requests issued by the Division on that study.

Based on my review of the Company's transfer capability study thus far, I believe that the Company used several assumptions and methods that may not provide a reasonable assessment of the change in transfer limit that would result from the Transmission Projects.

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First, the Company has assumed that the multiple identified RAS are suitable solutions to a reliability problem that is created through the integration of a large amount of new generation capacity. The Company has not explained how planning on the use of this RAS reflects prudent system operation, but acknowledged this in response to a data request that overreliance on such schemes is not viewed as prudent, stating:

> *While well-studied Remedial Action Schemes are one transmission planning tool, the safe, reliable operation of the Bulk Electric System (BES) is paramount. Reliance on excessive generator tripping/curtailment or operator intervention is not viewed as prudent transmission planning for the BES.*[53]

Second, the study's primary conclusion that the Company can integrate 1,169 MW of new wind by flowing 1,696 MW over the new Aeolus West path relies on an assumption that it is acceptable to severely limit the TOT 4B path.[54] The study evaluates five combinations of flows over the Aeolus West and TOT 4B path; in four of these cases, the TOT 4B flow is limited to a point below its full path rating of 857 MW. In the case with 1,696 MW flowing over Aeolus West, TOT 4B is limited to only 103 MW. In the case in which TOT 4B is flowing at its path rating, only 1,575 MW is permitted to flow over the Aeolus West path.

We are continuing our review of the study and the responses to discovery to assess the Company's view that all of the proposed wind energy can be integrated into the system.

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53 RMP Response to Data Request OCS 8.9.

54 Attachment to the Company's Response to OCS 8.1. *Aeolus West Transmission Path Transfer Capability Assessment, Preliminary Study Report*, October 2017, p. 12.

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Q. Can you quantify the effect of reducing the incremental wind on the economic benefits of the Combined Projects?

A. I have prepared an analysis approximating the impact of reducing the incremental wind generation on the 30-year Medium Gas, Medium CO_2 analysis. To fully analyze the effect would require the use of the Company's models, so this should be considered in indicative analysis.

The Company's analysis forecasts a net benefit of $137 million for this scenario. This calculation is comprised of several components, listed in the first column in the table below. The components that will vary based on the amount of incremental wind include [redacted]. I have modified these elements as a pro rata share of the total wind capacity added in the proposal to estimate the impact of reducing the assumed additional wind capacity. My analysis concluded [redacted].

This analysis shows that even a relatively small reduction in amount of wind capacity that can be interconnected could reduce or eliminate the project benefits in the Medium Gas, Medium CO_2 scenario and would be net costs in all scenarios with lower gas and carbon price assumptions.

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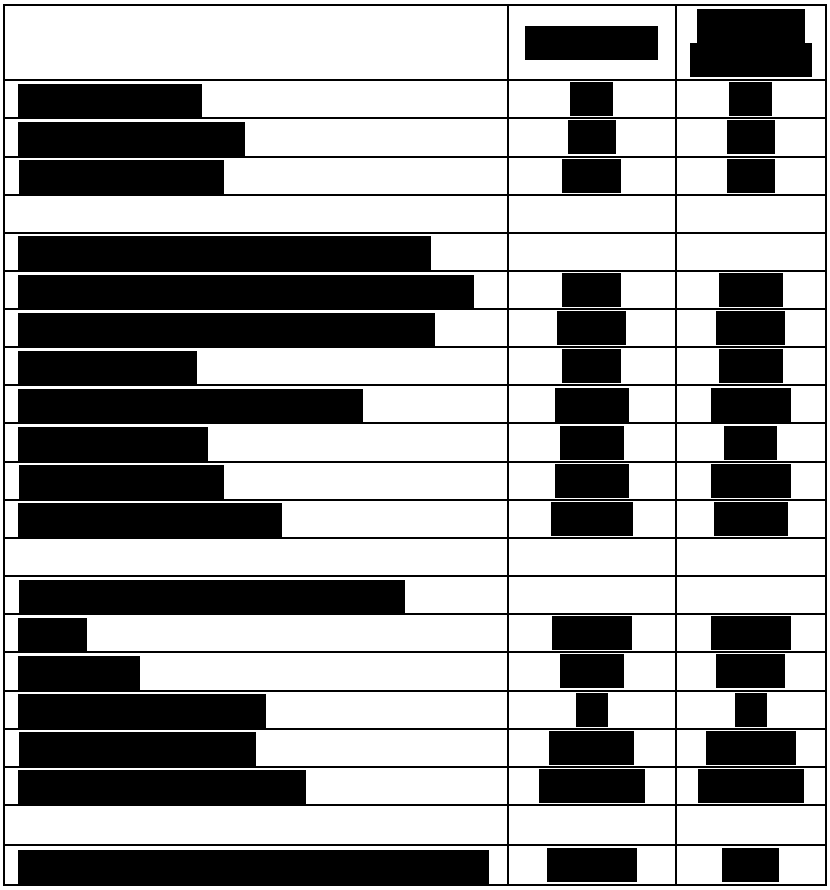
586 This is a simplified, indicative analysis, and given the uncertainties regarding the transfer
587 capability of the Transmission Projects, the Company should provide a sensitivity
588 analysis evaluate the impact of lower levels of wind interconnection.

589 **Table 1. Sensitivity analysis of reduction in installed wind capacity, 30-year results[55]**



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[55] Calculations derived from Link workpaper "Gateway Results Direct Testimony.xlsx", "Price-Policy Annual – PaR" worksheet.

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Q. Do you have any other concerns related to the study assumptions and methods?

A. Yes. The Company made an assumption to use dynamic line ratings for the Platte – Standpipe 230 kV segment, rather than the normal and emergency line ratings. Dynamic line ratings are generally determined by system operators based on actual system conditions, environmental factors (ambient temperature, wind speed, etc.) and are for short-term operational use. The Company has not provided support for its decision to use dynamic line ratings for the planning study, which can overestimate the transfer capability on a particular transmission segment. In this study, the use of dynamic line ratings allows extra flow over the Platte – Standpipe 230 kV during contingency conditions than would be permitted if the Company used standard line ratings. The Company should clarify the rationale for its use of dynamic line ratings for this study.

Lastly, the study applies a different assumption from the existing path definition by moving the Platte area load to the east of the Aeolus West cut plane.[56] The Company uses this change to claim that the east-to-west transfer limit is "effectively" increased by an additional 82.5 MW because of the shift of this load. The study does not provide a basis for making this modification to the treatment of the Platte area load, but the effect of the change appears to be that this modification reduces the amount of flow across the Aeolus West path. With this change, the Platte – Latham 230 kV line essentially replaces the Platte – Standpipe 230 kV line as one of the elements of the path, and since higher

[56] Id. at p. 12.

dynamic line ratings are assumed for the Platte – Standpipe 230 kV line, the line is able to support a higher secure transfer limit.[57] Much like the RAS, the total transfer capability increase is dependent on a load level and not the transmission system limitation. The Company should clarify the rationale for the change in treatment of the Platte area load.

These last two assumptions, taken together, appear to create a higher transfer capability result than the limit developed for the current path rating. The Company should provide more information regarding these assumptions for this preliminary study regarding the basis for assuming that these will be found to be acceptable in the final determination of the path rating through the WECC process. The outcome of the WECC determination will not be known until 2020, posing a risk that would be borne by ratepayers.

Q. Why do you believe that the transfer capability study does not support the proposal to integrate up to 1,270 MW of wind?

A. My conclusions are based on a few aspects of the Company's study.

First, the Company's primary analysis in the study does not evaluate 1,270 MW of incremental wind. Rather, the primary objective of the study is to evaluate 1,169 MW of incremental wind.[58] This includes the 320 MW of new QF wind, as well as 849 MW of

[57] The Company has confirmed that if the Platte area loads were modeled "downstream" from the Aeolus West Path, the Aeolus West transfer levels on the nomogram would be increased by 82.5 MW. This would further decrease the transfer limit over the TOT 4B path. See RMP Response to Data Request DPU 10.10(b).

[58] Attachment to the Company's Response to OCS 8.1. *Aeolus West Transmission Path Transfer Capability Assessment, Preliminary Study Report*, October 2017, p. 4.

additional new wind capacity in southeastern Wyoming.[59] The primary analysis conducted power flow and dynamic stability analyses on the system with the addition of the 1,169 MW, and included multiple configurations of simultaneous interaction between the Aeolus West path and the TOT 4B path, which cuts across northern Wyoming. The study evaluates a higher level of wind only as a single sensitivity case.[60]

This sensitivity, however, includes changes to the study assumptions, in particular the location of the incremental wind. In order to integrate that level of wind, the sensitivity reduces the amount of generation being integrated on the 230 kV system in southeastern Wyoming – the location closest to the most constrained transmission elements of the Aeolus West path – and integrates additional generation in northern Wyoming near the Wyodak Plant.

Given the change in location of generation, this study does not support the Company's Application, which requests the approval of the integration of the 320 MW of QF project, the incremental 860 MW, which could include the southeastern Wyoming benchmark projects that were dispatched in the study (pre-sensitivity conditions), plus up to an additional 110 MW of other incremental wind. The Company did not provide a study demonstrating that the proposed Transmission Projects can reliably accommodate this specific configuration of 1,270 MW of incremental wind.

[59] Id. at p. 10.
[60] Id. at p. 17. The study claims that the sensitivity evaluated 1,270 MW of additional wind generation, but the study lists 1,296 MW of additions. The Division has submitted a Data Request to clarify this discrepancy.

Q. What are your concerns with the acceptance of the study results by WECC?

A. The Company has provided a preliminary assessment of the increase in transfer capability with the addition of the Transmission Projects. The actual process of defining path ratings in WECC, however, takes several years. The process is also much more extensive, involving a WECC study group, and testing the interaction of the modified path with many other WECC paths; this study examined only interaction with the TOT 4B path.[61] My concern is that the assumptions, methods, and conclusions of this initial study may not be consistent with the WECC process. There is no assurance today that the ultimate conclusions regarding transfer capability will be consistent with the Company's preliminary study. And while this process won't be complete for years, the Transmission Projects and Wind Projects must be under construction soon in order to qualify for PTCs. If WECC's study process has different conclusions, it could result in the curtailment of wind and loss of customer benefits.

Q. How would the issues you have identified here present additional risks to ratepayers?

A. The Company's study includes several assumptions and methods that could overestimate the increase in transfer limits resulting from the Transmission Projects and the total amount of wind energy that can be integrated into the systemin eastern Wyoming. In addition, the Company is using the conclusions of this study to support the application for

[61] RMP Response to Data Request DPU 8.3.

pre-approval to interconnect up to 1,270 MW of new wind capacity. However, the final determination on how much wind can be interconnected and delivered to the west will not be made until WECC completes its study process, which will be years from now.

If the WECC study process concludes that the Transmission Projects (including allowable RAS) are not sufficient to increase the transfer capability from east to west and allow delivery of the incremental wind, it could require either curtailment of the wind, or additional transmission upgrades to increase the transfer capability further. Since the economic benefits analysis presented in the Direct Testimony of Rick Link is based on the addition of 1,180 MW of new wind (fully dispatched), this outcome would decrease the benefits to customers and therefore represents a risk that ratepayers must bear.

Q. Do you have any other concerns regarding the Company's transmission studies?

A. Not at this time. However, the Company provided the transfer capability study only at the end of October, four months after the initial case filing and two weeks after the technical conference. The Division will be reviewing the responses to discovery just received and may issue additional data requests on the studies. I will continue my review of the study and the new information provided.

VI. The Company's Analysis Does Not Reasonably Address Risk

Q. Please describe your concerns regarding the treatment of risk in the Company's analysis.

A. As previously discussed, the Company's multiple analyses show relatively small or negative net benefits to customers. The benefits in these cases are uncertain, with the ratepayers being asked to assume those risks.

The two risk factors assessed in these scenarios (fuel price and carbon price), represent the only explicit treatment of risk factors in the Company's analysis, and I have concerns with the Company's treatment of both.

There are a variety of additional factors that could negatively impact the actual economics of these projects, and could potentially result in the Combined Projects inducing net cost to customers, rather than yielding net benefits.

My primary concern is that, as proposed, all identified risk factors are borne entirely by ratepayers, and do not impact the benefits yielded by the Company.

Q. Please provide an overview of the fuel price forecasts used by the Company in this analysis.

A. The Company developed low, high, and two medium fuel price assumptions for the price-policy scenarios. The scenarios were chosen by the Company after reviewing third-party forecasts from the U.S Energy Information Administration (EIA) and non-public

vendor sources.[62] One medium scenario was selected from one of the vendor forecasts and is "reasonably aligned with other base-case forecasts."[63] The other medium price (used only with the Zero CO_2 price assumption), is the April 2017 Official Forward Price Curve (OFPC). The OFPC uses forward market prices (observed April 26, 2017) for 72 months, and then transitions to the first (vendor-based) medium price forecast.[64] The low and high prices are derived from vendor forecasts.

Q. How do the four selected natural gas forecasts compare to current futures prices?

A. The Company's four forecasts (Low, OFPC, Medium, and High) are compared against NYMEX forward prices as of November 28, 2017 in Figure 3.[65]

[62] Direct Testimony of Rick T. Link, lines 714 – 723.
[63] Id. at lines 727 – 730.
[64] Id. at lines 714 – 718.
[65] Direct Testimony of Rick T. Link, Exhibit RTL-2.

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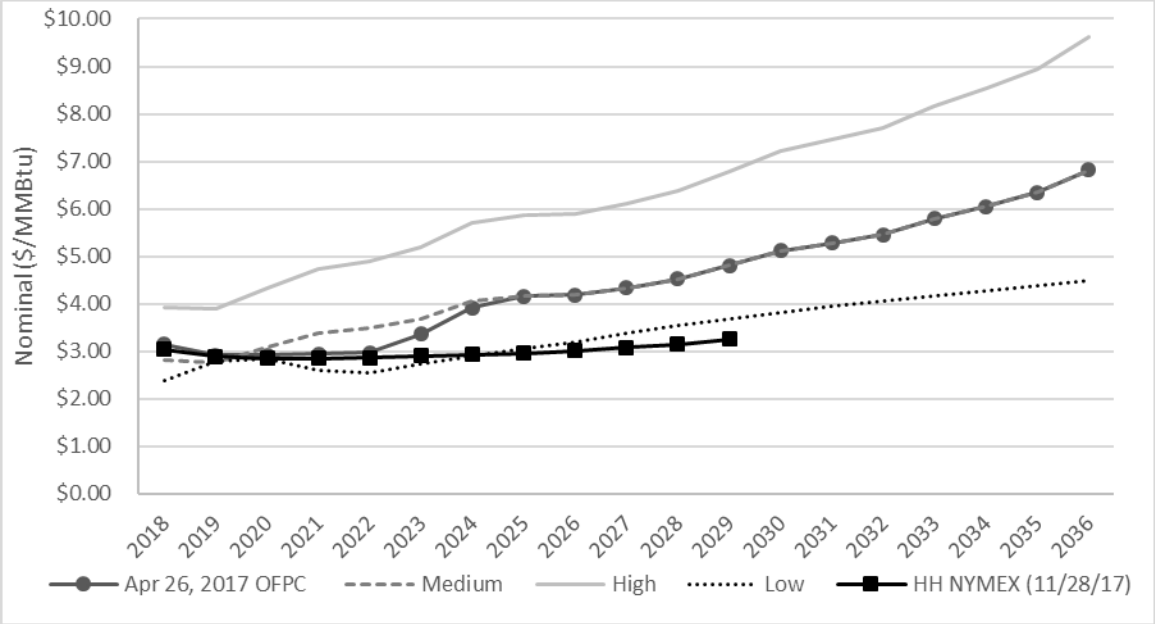

Figure 3. Natural gas price forecasts

This figure demonstrates that current market expectations of gas prices, as seen in Henry Hub natural gas futures, are significantly lower than the Company's medium gas base case and lower than even its lowest gas price forecast in many years.

Q. Do current forward prices provide the most accurate forecast of natural gas prices?

A. Not necessarily. Forward prices are the result of actual contracts entered into by market participants. Far into the future, there are not many participants entering contracts and committing capital, and the motivations of individual participants are not always known. However, forward prices do provide important data on the perspective of actual market participants committing capital. While it is not necessarily an accurate prediction of

future prices, a natural gas price forecast based on forward prices is at least as important to consider as a Medium forecast based on a point-in-time third party vendor forecast.

Q. Given the comparison of current market forwards with the Company's gas scenarios, do you have any concerns with the representation of benefits based on these scenarios?

A. Yes, I do. Natural gas prices drive a significant portion of the benefits of the Combined Projects. Given that two of three price-policy scenarios using the low gas price forecast result in net costs to customers, it is critical to assess these forecasts in particular and the potential risks posed to customers. Since the current market outlook, as reflected in the forward prices, most closely aligns with the low gas forecast, I am concerned that the Combined Projects may not produce the net benefits to customers as described by the Company, as many of their conclusions on value rely on the Medium Gas scenarios. There is a distinct possibility that natural gas prices will be lower than the Medium Gas price forecast.

Q. Has the Company developed updated natural gas price forecasts since filing its Application?

A. Yes. In the Wind Repowering docket, the Company's rebuttal testimony presented revised analysis with an updated gas prices.[66] In addition, the Company intends to revise

[66] Docket 17-035-39, Rebuttal Testimony of Rick Link (October 19, 2017) at lines 108 – 122.

its analysis with new natural gas prices to be filed February 2018 in that docket.[67] However, the Company has not updated the analysis in this case, and is not planning to do so until its supplemental filing in January 2018.[68]

Q. What do you conclude regarding the Company's natural gas price assumptions?

A. Natural gas price forecasts have a significant impact on the determination of project benefits. The Company has developed a new OFPC since the filing of the Application, has received new low and high natural gas price forecasts from its vendors, and has not revised its analysis in this docket to incorporate the new information into the calculation of benefits.

In addition, the three forecasts used by the Company appear to be skewed high, particularly compared to current futures prices, which are below the Low Gas forecast in many years. In addition, given the recent movement in natural gas futures prices, I expect that when the Company updates its high, low, and medium forecasts, they will all be lower than the forecasts used in the Application.

Therefore, I do not believe that the gas prices analyzed by the Company reflect a reasonable range of futures, and I believe that based on the scenarios provided at this point, the Company has not demonstrated that there is a high or even reasonable

[67] Docket 17-035-39, Unopposed Motion to Amend Procedural Schedule (November 22, 2017).
[68] RMP Response to Data Request DPU 9.1.

likelihood that the Combined Projects will provide net benefits to ratepayers across the range of possible natural gas price outlooks.

The Company's analysis does not include its current natural gas price outlook. The update that the Company plans to file in January should include more current forecasts of natural gas prices, and the analysis should be conducted in a manner to demonstrate a high likelihood of benefits of the Combined Projects to ratepayers.

Q. What are your concerns regarding the Company's treatment of carbon price risk?

A. The Company has evaluated the projects using three carbon price scenarios.[69]

I do not have any particular issues with the three specific scenarios selected by the Company. Rather, I think it is important to recognize that there is currently no policy imposing a price on carbon emissions. Therefore, similar to the discussion on the natural gas forecasts, given the information available today, the scenarios with zero carbon price correspond with the current policy and near-term outlook on such policies. The zero carbon price scenarios yield net costs to customers in some price-policy scenarios. As with natural gas prices, the Company's analysis should demonstrate a high likelihood of benefits.

[69] Id. at lines 743 – 750 and Figure 2, p. 35.

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Q. How does the Company's treatment of natural gas price and CO_2 price risk affect your assessment of the price-policy scenarios?

A. Based on the forgoing discussion, taken together, the price-policy scenario that most closely reflects expectations of future market conditions given the information available today is the Low Gas, Zero CO_2 scenario. In the Company's analysis, this scenario produces net costs to customers in the 20-year analysis and 30-year analysis.

While this scenario is not necessarily the most likely scenario, it is certainly a possible future. Given that the proposal is being pursued for economic reasons and not for reliability or other purposes, I believe the Company should demonstrate benefits to customers under this scenario in order to demonstrate that the Combined Projects have a high likelihood of providing benefits to customers. A comprehensive review of the adverse outcomes under plausible scenarios is necessary to provide assurance of a much higher probability of benefits to customers. The Combined Projects should be sufficiently robust to be beneficial across a reasonable range of market and policy outcomes.

Q. What are some additional risk factors that the Company has not addressed?

A. There are a number of project specific risk factors that could reduce or eliminate project benefits to ratepayers, including:

- PTC qualification and revenue;
- Corporate tax rate;
- Wind and Transmission Projects cost estimates;

- Production estimates;
- Transmission Projects transfer capability; and
- Transmission revenue.

This list is not exclusive, but includes several key risks associated with the Combined Projects.

It is important to reiterate that these are potential risks that could reduce benefits or increase the costs of the Combined Projects. As currently proposed, these impacts would be borne entirely by customers and not by the Company.

A. PTC Qualification and Revenue

Q. Please describe the risks associated with PTC qualification and revenue.

A. The Company has proposed the Combined Projects as an economic project designed to yield benefits to customers. The qualification for ten years of PTC revenue is a primary driver of benefits, and the project would not be economically viable without the full value of the PTC applied.[70]

The current tax law and IRS rules implementing that law establish a number of requirements regarding eligibility to receive PTC benefits, many of which are subject to some uncertainty. Additionally, the tax reform legislation recently passed by the U.S.

[70] Direct Testimony of Rick Vail, lines 69 – 71.

House of Representatives contains some provisions that may exacerbate qualification risks and may reduce potential PTC benefits.

Q. Please describe the requirements the Company cites it must meet in order to qualify for the PTC.

A. Under current IRS rules, in order for the proposed Combined Projects to qualify for the full value of the PTC, the proposed Wind Projects must satisfy the 5 percent Safe Harbor requirement and be placed in service by December 31, 2020.

Q. Please describe the 5 percent Safe Harbor as it pertains to the facilities.

A. To qualify for the full value of the PTC (rather than a lower "phase out" value), the Wind Projects must begin construction in 2016. The Safe Harbor requirement states that, in general, construction of a facility will be considered as having begun in the calendar year in which (1) the taxpayer pays or incurs 5 percent or more of the total cost of the facility, and (2) thereafter, the taxpayer makes continuous efforts to advance towards completion of the facility.

Q. Are the Company's benchmark projects in compliance with the 5 percent Safe Harbor rules for the proposed Wind Projects?

A. The Company has asserted that it has made sufficient equipment purchases in 2016 to satisfy the 5 percent Safe Harbor rules for each of the Wind Projects.[71]

[71] Direct Testimony of Chad Teply, lines 255 – 257. See also RMP Response to Data Request DPU 5.2.

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Q. Please describe the "Continuous Efforts" requirement under the 5 percent Safe Harbor.

A. Once a project begins construction (or complies with the 5 percent Safe Harbor rule), the project developer must make continuous efforts to complete the project. Whether a taxpayer makes continuous efforts to advance the facility will be determined by the relevant facts and circumstances. These can include but are not limited to: paying or incurring additional amounts included in the total cost of the facility; entering into binding written contracts for components or future work on construction of the facility; obtaining necessary permits; and performing physical work of a significant nature (see above). Certain disruptions (severe weather/natural disasters, licensing delays, supply shortages, etc.) will be considered out of the taxpayer's control and therefore, will not be considered when evaluating the taxpayer's continuous effort.[72]

The IRS has issued guidance indicating that regardless of development activities, the project developer can meet the continuous effort requirement if the project is in service by the end of the fourth calendar year following the year construction began. Therefore, given the purchases made by the Company in 2016, the projects must be placed in service by December 31, 2020 to meet this requirement.[73]

[72] IRS Notice 2013-29.
[73] Direct Testimony of Chad Teply, line 123 – 133.

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Q. Please describe what is meant by "placed in service" by December 31, 2020.

A. The IRS and the courts hold that an electric generating facility is "placed in service" when the facility is ready and available for its specifically assigned function. Historically, the IRS has looked to five factors in evaluating whether an electric generating facility is ready and available for its specifically assigned function. These are: (1) approval of required licenses and permits; (2) passage of control of the facility to the taxpayer; (3) completion of critical tests; (4) synchronization to the power grid for generating electricity to produce income; and (5) commencement of daily and regular operation.[74]

Q. Is there risk that some or all of the Company's benchmark projects might not be in service by the end of 2020?

A. Yes. Aside from the ordinary issues that might cause a development delay for a wind project (e.g. permitting, financing, etc.), the Company testified in the Wind Repowering docket that its equipment suppliers are facing unprecedented demand for turbines, and that construction contractors and critical equipment (such as cranes) are similarly in high demand.[75] Unavailability of either equipment or labor could cause delays such that the projects are not fully in service by December 31, 2020 and thus would not qualify for the PTC.

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[74] IRS: Rev. Rul. 76-256; Rev. Rul. 76-248, Wind (PLR 201311003). See also Hecimovich & Americus. 2015. Placed-in-Service Date Issues. Deloitte. https://www2.deloitte.com/content/dam/Deloitte/us/Documents/energy-resources/us-er-placed-in-service-date-issues.pdf

[75] Direct Testimony of Timothy Hemstreet, Docket No. 17-035-39, lines 523 – 545.

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Q. Is there risk that the Transmission Projects might not be complete by the end of 2020?

A. Yes. A delay in the Transmission Projects would negatively impact the net benefits of the projects. The current schedule anticipates a completion date of November 15, 2020, leaving only a 45-day window for delays. The Company has stated that it has not assessed the impact of a delay in the construction of the Transmission Projects.[76] Instead, the Company asserts that it has significant experience meeting project deadlines and that a 45-day buffer is consistent with other major projects it has completed.[77]

The Company also has not yet received all the permitting approvals necessary for the Transmission Projects. In fact, the Company does not intend to apply for some key permits until the second half of 2018.[78] This exposes the project to risk, both of increased project cost and potential project delay.

Q. Has the Company provided any analysis of the risk of the benchmark projects becoming ineligible for the PTC due to a delay in commercial operation date or other failure to meet the Continuous Effort requirement?

A. No, the Company has stated it has not performed any analysis with regard to this risk.[79]

[76] RMP Response to Data Request OCS 1.6.
[77] RMP Response to Data Request OCS 1.17.
[78] Direct Testimony of Rick Vail, Exhibit RMP_RAV-10.
[79] RMP Response to Data Request DPU 4.8.

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Q. Has the Company provided any mechanism for damage recovery due to "lost" PTC due to not being in service by December 31, 2020?

A. No. The Company has stated that it considers it highly unlikely that the wind projects will not achieve commercial operation by December 31, 2020.[80]

Q. How do the eligibility risks impact the projects being proposed under the 2017R RFP?

A. The Company has stated that for PPAs resulting from the bids provided in response to the 2017 RFP, any risks associated with PTC qualification will reside with the developer.[81]

Q. What is the risk to PTC revenue recently created by the federal tax reform legislation?

A. The legislation passed by the U.S. House of Representatives, includes a reduction in PTC level to remove the statutory escalation in the rate.[82] This would reduce the PTC level from the escalated 2.4¢/kWh assumed in the Company's economic analysis to a level of 1.5¢/kWh. The U.S. Senate passed its version of the tax reform legislation on December 1, 2017. Congress will likely be working to reconcile the two versions, but both bills cut the corporate tax rate from 35 percent to 20 percent. The PTC escalation will be worked

[80] RMP Response to Data Request DPU 6.3.
[81] RMP Response to Data Request DPU 5.1.
[82] *Tax Cuts and Jobs Act*, released on November 2, 2017, Section 3501 – Modifications to Credit for Electricity Produced from Certain Renewable Resources.

out in Congress, but if included in the final legislation, it would drastically reduce or eliminate the benefits of the Combined Projects to ratepayers.

In addition, the recent tax reform legislation passed the U.S. House of Representatives may modify the IRS guidance regarding compliance with the "continuous construction" requirement (discussed above). The law may codify the continuous effort requirement, effectively voiding the IRS guidance that completion by the end of the fourth calendar year is sufficient for PTC qualification. This could effectively eliminate PTC revenue for the Wind Projects.

B. Corporate Tax Rate

Q. Please describe the risks associated with the corporate tax rate assumptions.

A. The primary driver of the proposal is to secure PTC revenue. Since PTCs are an after-tax benefit, in order to appropriately treat these revenues in a PVRR(d) analysis, the value must be grossed up using the Company's corporate tax rate. The Company has performed its analysis grossing up PTC revenues based on a tax rate of [redacted].[83]

If this tax rate were to decrease, the grossed-up value of the PTCs would decrease as well. With the current efforts in the federal government to lower the corporate tax rate, this presents a risk to customers that the benefits of the projects will decline in the future.

[83] Link Testimony Workpapers. See, e.g. "Energy Gateway GM 2017 03 13 w Bonus.xlsm", Generic sheet, cell K17. [redacted]

The U.S. Senate and House of Representatives have each passed versions of the *Tax Cuts and Jobs Act*. While there are differences between the versions to be reconciled, they each include a reduction in the corporate tax rate from 35 percent to 20 percent.

Q. Has the Company analyzed how changes in corporate tax rate would impact the estimated project benefits?

A. Not in this proceeding. The Company has stated it will "consider potential tax reform impacts on the proposed Wind and Transmission Projects in the supplemental filing in mid-January 2018.[84]

The Company did assess a sensitivity in the Wind Repowering docket in which the corporate tax rate was reduced to 25 percent.[85] This analysis found that the net benefits were reduced dramatically in that sensitivity. I would expect to see similar results in this docket. Further, given that both the House and Senate versions include a 20 percent rate, the impact would be more significant that than shown in the Company's repowering case sensitivity.

Q. Have you prepared an estimate of the impact a change in corporate tax rate would have on the calculation of benefits?

A. Yes, I have. Using the workpapers provided by the Company in support of the Direct Testimony of Rick Link, I tested the impact of a change in federal corporate tax rates to

[84] RMP Response to Data Request DPU 9.2.
[85] Docket No. 17-035-39. Rebuttal Testimony of Rick Link, lines 637 – 699.

assess the impact on PTC benefits. Given the tax legislation recently passed by the U.S. House of Representatives and the legislation currently proposed by the U.S. Senate, I tested the impact of a reduction of the federal corporate tax rate to 20 percent.

The Company's analysis calculated the NPV of the PTC revenue as [redacted].[86] With the reduction in tax rate, this figure drops to [redacted]. This reduction of [redacted] would directly impact the net benefits numbers. This change would have a large impact on the net benefits figures for several of the price-policy scenarios, [redacted] the $137 million net benefit featured in Ms. Crane's testimony (based on the Medium Gas, Medium CO_2 scenario).

Q. What do you conclude from this analysis?

A. I conclude that, all else equal, a change in the corporate tax rate could have a substantial adverse impact on the value of the PTC benefits [redacted]

[86] See, e.g. Link Testimony Workpaper "Gateway Results Direct Testimony.xlsm", Price-Policy Annual – PaR worksheet, cell D93.

I caveat this conclusion by noting that a change in the corporate tax rate could impact many components of this analysis (such as debt rates and discount rates) as well as broader market conditions (such as electricity demand and cost of capital investments).

I am not suggesting that a change in tax rate will yield the specific results I have estimated. Rather, I have isolated the impact of the corporate tax rate to provide an indication of the magnitude of the risk to ratepayers associated with the rate assumption.

C. Wind and Transmission Projects Costs

Q. Please describe the risks related to project costs.

A. There are multiple risks to customers associated with the costs of the Combined Projects. If the projects' actual costs do not reflect the estimates provided by the Company, there could potentially be significant impacts on customers.

First, as discussed at the beginning of my testimony, the total benefits of the project in many price-policy scenarios are very small (or negative) when compared to the project's total costs. Therefore, a small percentage increase in the costs of either the Wind Projects or Transmission Projects could significantly reduce or eliminate customer benefits. The cost estimates for the Combined Projects included in the Company's Application are not yet final. The costs of the Wind Projects are proxy estimates, as the final project selection will be conducted after the evaluation of RFP bids. The ratepayer risks associated with project costs will differ substantially depending on whether the final

projects are self-build or a PPA, and whether the Company has (and exercises) an option to buy the project from the developer.

Second, the qualification for the PTC is dependent on actual wind project costs. For the benchmark projects, if the total project costs are high enough that the 2016 purchases do not make up at least 5 percent of the costs, the project will fail the 5 percent Safe Harbor rule and will not qualify for the PTC. As I previously discussed, the PTC revenue is critical to the viability of the projects, so a large capital cost deviation could have a severe impact on project benefits. This cost risk may be mitigated if the Company enters into a PPA with third party developers for the wind projects as a result of the RFP, depending on the terms of the agreement.

D. Production Estimates

Q. Please describe the risks associated with project generation estimates.

A. The benefits of the project rely on the PTC revenue, as well as the energy generated by the new wind projects. The Company's analysis is therefore very sensitive to the assumptions of the future production of the projects.

Q. Can you estimate the potential magnitude of the risk?

A. Yes. As an example of the potential risk, I have calculated the impact of a small underperformance of the wind resources on PTC revenue. The Company's 30-year analysis includes a total incremental PTC benefit of [redacted] (NPV). This presumes

an average capacity factor for the non-QF projects of [redacted]. If the resources ultimately selected and constructed produce less than anticipated, the PTC revenue will be correspondingly reduced. Each 1 percent reduction in total megawatt-hours generated by the facilities would result in a [redacted] (NPV) decrease in net benefits from PTC revenue. There would also be a decrease in net power cost benefits, but it is not possible to estimate this effect without running the Company's SO and PaR models. These effects represent risks to customer benefit estimates associated with the output assumptions.

Q. What do you conclude based on this analysis?

A. The PTC revenue represents a critical component of the economic benefits of the project, and the Company's revenue estimates are based entirely on assumed capacity factors. Wind generation is highly variable, and there is definite potential that actual project generation could be less than assumed.

For some of the scenarios resulting in lower net benefits, even a small decrease in generation could result in net costs to customers.

The PTC risk of the negative consequences of lower generation is borne entirely by ratepayers.

E. Transmission Projects' Transfer Capability

Q. Please describe the risks associated with the Transmission Projects' transfer capacity.

A. I have previously described the potential risks associated with the Transmission Projects' transfer capability. If the incremental transfer capacity is not sufficient to allow the full dispatch and utilization of the new wind resources, these resources will not reduce system PVRR to the extent assumed in the Company's analysis.

I am repeating this issue here to emphasize that, as currently proposed, ratepayers, rather than the Company, bear the risk that any reduction in the final transfer capability is not sufficient to allow full utilization of the wind resources, and that the net benefits of the projects are reduced or eliminated.

F. Transmission Revenue

Q. Please describe the risks associated with transmission revenue.

A. The Company has assumed that a portion of the capital costs of the Transmission Projects will be paid for by third-party transmission customers.[87] These customers pay for transmission service under PacifiCorp's Open Access Transmission Tariff (OATT). If the Transmission Projects are approved inclusion in the OATT as network transmission

[87] Direct Testimony of Rick Link, lines 530-551.

assets, the tariff charges from these customers could offset a portion of the cost of projects.

For the purposes of the economic benefits analysis the Company has assumed that these customers will pay for 12 percent of the cost of the Transmission Projects.[88] The Company has not provided any project-specific or forward-looking analysis of the transmission revenues. Rather, it assumes the average third-party revenues on its system in the recent past is representative of the revenue that will be realized for this project over the life of the Wind Projects.

In the Company's 30-year economic analysis this totals [redacted], consistent across all price-policy scenarios. This represents [redacted] of the net benefits in the Medium Gas, Medium CO2 case and is [redacted] in some cases.

Based on the limited analysis presented as the basis for this assumption, it is clear there is a range of potential values even if the assumption that the historical performance on the Company's OATT is a reasonable predictor of revenues associated with the Transmission Projects. As with other uncertainties, the ratepayers will bear the risk that this assumption is an overstatement of actual revenues. The 12 percent assumption is based on analysis conducted by the Company that found that, in recent years, third parties have covered 10-13 percent the OATT transmission revenue requirement.[89] If the 10 percent value was assumed, this would [redacted]

[88] Id. at lines 547-551.
[89] RMP Response to Data Request OCS 2.1.

[redacted]. It is unclear whether this historical range is representative of the actual range of revenues that ratepayers can expect to realize specifically associated with the Transmission Projects.

VII. Conclusions and Recommendations

Q. Does the Company's analysis demonstrate that the Combined Projects will deliver cost-effective energy to Utah ratepayers?

A. No, it does not. The Company's analysis of the Combined Projects does not provide a high degree of assurance that they will be cost effective for Utah ratepayers. A number of the scenarios evaluated by the Company produce either net cost or very limited net benefits.

Q. Is the Company's modeling analysis of the Combined Projects sound and does that analysis provide an accurate representation of the economic benefits of each of the Combined Projects?

A. No, it is not. The Company's analysis is not based on its most current assumptions on inputs such as load forecast and fuel prices. The Company has acknowledged that and indicates that it will provide that analysis in its January 2018 filing. The modeling is also problematic for the longer-term analysis that relies on an extrapolation of the results from the 20-year SO model for values in the years 2037 - 2050. Finally, the Company did not

consider, and as a consequence it did not evaluate, alternative transmission configurations or project sizes.

Q. Does the Company's analysis provide a reasonable representation of the all of the uncertainties that have bearing on the risk to Utah ratepayers?

A. No, it does not. The Company has not provided any analysis on several key risks that, as proposed, are risks that would be borne by ratepayers. These risks include uncertainty regarding the ability of the projects to qualify for production tax credits, the potential for changes in the corporate tax rate, project cost uncertainty, project energy production estimate uncertainty, the Transmission Projects increase in transfer capability and ability to support 1,270 MW of new Wind, Transmission Projects permitting risk, and Transmission Project revenues. I have described these risks and have shown that they are of sufficient magnitude to have the potential to outweigh the benefits that the Company has put forth.

Q. Are the Combined Projects likely to be lowest reasonable cost resources?

A. While it is possible that the Combined Projects could be lowest reasonable cost resources, there is a significant probability that they are not. The Company's analysis points to relatively low value to ratepayers including cases with negative value. Given the issues I have identified with the Company's modeling and the lack of consideration of several important risk factors, I view the Company's results as not sufficient to provide confidence that these projects are lowest reasonable cost. Further, the Company only

considered one Transmission Project configuration and one Wind Project configuration, meaning there is no information presented by the Company that this combination of wind and transmission is the lowest cost or highest benefit option available.

Q. What are the short-term and long-term impacts to Utah ratepayers?

A. The Company's presentation on the projects relies on significant benefits in the first ten years resulting from PTC qualification and benefits in years 20 to 30 of project life associated with extending the life of the assets. The PTC benefits, if fully realized, would mitigate much of the cost in the first 10 years, however, the risks regarding PTC qualification and changes in corporate tax rates could materially alter that outlook. Conversely, much of the benefit in the Company's analysis is derived from years 20 to 30 of the projects, the life extension period. These benefits have been estimated using an extrapolation analysis that is problematic and are only realized in the very long term.

Q. Based on your findings, what are your recommendations at this time?

A. I recommend that the Combined Projects not be approved based on the analysis presented by the Company. I further recommend that the Company's filing with new economic analysis planned for January 2018 reasonably addresses the methodology and risk issues that I have discussed in this testimony.

Q. Does this conclude your testimony?

A. At this time, yes, it does. If additional, relevant information becomes available, I will supplement this testimony as appropriate.