

**BEFORE THE PUBLIC UTILITY COMMISSION**

**OF OREGON**

**LC 67**

In the Matter of )  
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PACIFICCORP, dba PACIFIC POWER, )  
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2017 Integrated Resource Plan )  
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OPENING COMMENTS OF OREGON  
DEPARTMENT OF ENERGY

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**Introduction**

These comments by the Oregon Department of Energy (ODOE, or Department) on the 2017 PacifiCorp Integrated Resource Plan (IRP, or Plan) represent our view of the plan’s potential to further the state’s energy and climate goals. Energy resource choices have a large effect on the state’s likelihood of achieving these goals. Given this context, both the process and the result are important to the Department, and our comments are divided into three main sections.

- A. ODOE commends PacifiCorp (or Company) on a well-executed IRP development process overall, and has identified areas where welcome improvements have been made.
- B. ODOE is in general agreement with PacifiCorp on the elements of the preferred portfolio, and calls out certain areas that support or accelerate statewide energy and climate goals.
- C. ODOE has some concerns about aspects of the 2017 IRP development process and/or results, and these are presented as questions for the 2017 IRP or as suggestions for future IRPs. These issues can be summarized in six points: 1) Reliance on Market Purchases and Alternatives for Capacity, 2) Capacity Contribution of Wind and Solar, 3) Wind Repowering, 4) Transmission Build and the Energy Gateway 4 Portfolio, 5) Forecasted Low Load Growth and Private Generation Assumptions, and 6) Significant Changes to the Preferred Portfolio in the Final Stages of IRP Development Process.

## **A. IRP Development Process**

ODOE appreciates the multiple improvements evident in the 2017 IRP development process and in PacifiCorp's efforts to communicate with stakeholders. The Department recognizes that the Company made significant efforts to respond to suggestions for improvements to the IRP process since the 2015 IRP. ODOE finds especially effective PacifiCorp's willingness to re-work the modeling process such that portfolios with more innovative approaches could get through the first "gate" (System Optimizer model) and proceed into the more robust risk analysis (the Planning and Risk model).

Resource Portfolio Development Process – The portfolio development process was much improved from the process used in the 2015 IRP. The PacifiCorp IRP team created a new approach to the modeling that allowed a wider variety of core cases to be evaluated in System Optimizer (SO). The variety of core cases included innovative resources not intrinsically valued by SO; specifically, the Department appreciates flexible resources and direct load control (DLC) being included as core cases. The Company modeled a variety of flexible resource technologies including simple-cycle gas turbines, reciprocating engines, pumped storage, compressed air energy storage, and battery storage. Having the innovative resources evaluated in SO before moving on to the time-consuming Planning and Risk (PaR) analysis meant that stakeholders saw innovative resources get just as thorough modeling (SO and PaR) as more conventional resources. In addition, with stakeholder feedback, there were more opportunities to refine and re-visit core cases. One interesting result from this approach was learning that significantly increasing the amount of flexible resources, e.g. 10 percent up to 20 percent of the load and resource balance, results in the portfolios with the lowest CO<sub>2</sub> emissions. (These portfolios were not the most cost-effective, but the results highlight at least one significant value of system flexibility.) In the end, the Company's new modeling approach more efficiently produced alternative combinations of resources, and more diversity in portfolios examining a greater range of market price and environmental policy scenarios.

Stakeholder Requests and Communication – ODOE commends PacifiCorp for its diligence in responding to stakeholder questions and requests. The Company’s ability to adjust parameters in some of the core cases, and to add new modeling runs near the end of the IRP development, helped establish a more informed and robust preferred portfolio. The Regional Haze compliance scenarios were clearly identified, and the process for evaluation explained. If a violation of the Regional Haze rule is triggered, the EPA will take action, frequently leading to litigation by the Company, followed by a settlement. The Company made it clear that each plant is in a different stage in this process. The choice of one Regional Haze scenario (RH-5) to use as a base case moving forward into formulating the core cases was a very good one, and much less confusing than how Regional Haze compliance was treated in previous IRP development cycles. Similarly, the sensitivity cases were well-explained and stakeholders had input on the implementation of the cases.

Winter Peak Analysis – The Company modeled winter peak for the first time in an IRP context. This information will allow enforcement of the planning reserve margin on winter peak, and allows PacifiCorp to report winter load and resource balance. In addition, the modeling information can be used to evaluate direct load control programs targeting winter peak and market purchases used to satisfy winter peak loads.

Performance of Capacity Contribution Study and Flexible Reserve Study – PacifiCorp used the capacity factor approximation method to determine capacity values for wind and solar, in agreement with concurrent discussions on capacity contribution valuation methods at the Oregon PUC. The Department appreciates this consistency. The Company expanded the wind integration study into an overall assessment of flexible reserve demands driven by variable energy resources and uncertainty in load. In Public Meeting #7, January 2017, an interesting result was highlighted: system diversity of renewable resources, including Energy Imbalance Market (EIM), reduced reserve requirements by more than 37

percent. The flexible reserve study also resulted in an estimate for solar resource integration costs in the east and west parts of PacifiCorp's system.

Continued Smart Grid and Energy Storage Evaluations – The evaluation of smart grid and energy storage contributions to the resource mix were more detailed in this IRP, and clearly built on previous efforts and ongoing activity to comply with mandates such as Oregon HB 2193 (2015) requiring 5MWh of energy storage to be procured by 2020. ODOE is pleased that the company believes that “improving storage analytics is a priority.”<sup>1</sup>

Battery storage and compressed air energy storage (bulk storage) were two of 15 sensitivity studies benchmarked against the leading core case. This attention to emerging technologies in an IRP is very encouraging to ODOE.

#### **B. Aspects of the Preferred Portfolio Contributing To Reaching Oregon's Energy and Climate Goals**

The preferred portfolio contains many elements that the Department finds to be appropriate steps to achieving the state's energy and climate goals. Increased renewable energy generation and accelerated coal retirements over the planning period are positive steps compared to previous IRPs. ODOE appreciates PacifiCorp's consideration of diverse approaches that protect ratepayers and advance state energy goals.

Increase in Renewable Energy Resources – The 2017 IRP anticipates renewable energy build-out significantly earlier than in the 2015 IRP. This results in lowered carbon emissions and enables RPS compliance at low cost by capturing the federal Production Tax Credit for wind energy, only available for a limited time. The repowering element of the portfolio will get more energy out of the same nameplate MW of installed wind turbine facilities, eliminating the need to procure additional transmission rights. In addition, repowering significantly extends the operational life of the wind plants.

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<sup>1</sup> PacifiCorp 2017 Integrated Resource Plan, April 4 2017, Volume I, p. 255

Emphasis on Demand-Side Management – The investments in Class 1 and Class 2 demand-side management resources are well aligned with the Northwest Power and Conservation Council’s Seventh Power Plan, and a win-win for ratepayers. The Department finds it especially helpful that the company represented demand-side management as both an energy contribution (MWh) and a capacity contribution (MW).

RPS Compliance and Reduction in Carbon Emissions – PacifiCorp anticipates meeting Oregon RPS goals through 2034 with the additions of repowered wind and new renewable resources. Compliance through 2036 is achieved with the purchase of a very small amount of unbundled Renewable Energy Certificates (RECs). The increase in renewable resources earlier in the planning period (compared to the 2015 IRP) and the coal retirements in the first 10 years result in significantly reduced carbon emissions; this approach helps put Oregon on track for meeting statutory greenhouse gas emissions reduction goals and puts the Company in a better position should there be higher than expected carbon prices or new rigorous greenhouse gas reduction requirements in the planning period.

### **C. Requests for Clarification in the 2017 IRP or Improvement in the Next IRP**

1. Reliance on Market Purchases and Alternatives for Capacity – The preferred portfolio relies significantly on market purchases, also called Front Office Transactions (FOTs), although the levels are down in the four-year action plan compared to the 2015 IRP. The Company establishes an FOT planning limit based on regional resource adequacy studies; currently the planning limit is 1,575 MW. However, in Public Meeting #8, March 2017, the company stated that between 2009 and 2015, the company purchased FOTs to meet summer peak at a level over the planning limit approximately 34 percent of the time; winter peak FOTs 2009-2015 showed purchases over the planning limit approximately 17 percent of the time.

What is the risk to resource adequacy if the incidences of exceeding the FOT planning limit continue or increase in frequency? With other Northwest utilities tending toward summer peaking, what is

the risk that summer peak FOTs will be more expensive than shown in the current analysis and therefore no longer the least-cost, least-risk option?

*Recommendation: While the Department recognizes the financial benefits of market purchases as part of a diversified portfolio of resources to meet capacity needs, it is important to consider the risks of looking to the market for a considerable portion of the Company's energy and capacity resources. Therefore, in this IRP ODOE requests more in-depth discussion of risks associated with high levels of market purchases, especially during summer.*

*In the next IRP, ODOE would like to see analysis on energy efficiency and DLC explored as a hedge to risks of high levels of market purchases. ODOE encourages PacifiCorp to develop energy efficiency and DLC as capacity resources, not only for the purpose of offsetting load growth. Emphasis on energy efficiency technologies with high "capacity value," like HVAC, and acceleration of DLC program development (both winter and summer), could provide a low-risk hedge against high-priced or limited-availability FOTs.*

2. Capacity Contribution of Wind and Solar – A supporting study for the 2017 IRP used a new analytical approach to calculating capacity contributions of wind and solar: the "Capacity Factor Approximation Method." The technique uses 500-iteration hourly PaR runs, not looking at volatility of output but rather looking more at expected output based on hourly shapes and types of resources along with resource locations. Each hour's Loss of Load Probability (LOLP) is calculated; results shown for wind as "West" and "East" refer to PAC's two balancing authority areas (BAAs). The new method results in the capacity contribution for West wind going down from approximately 25 percent to approximately 12 percent, while the capacity contribution for East wind stays approximately 15 percent. This drop for West wind is because the high LOLP hours are now concentrated in summer months, not spring (as was the case in 2015).

About 1000 MW of solar was modeled in the 2020 scenario; a large majority of the solar resources modeled were qualifying facilities (QFs, projects of utility scale and not larger than 80 MW in nameplate capacity). A few larger solar projects, with capacity of approximately 100 MW each, were included. (Distributed solar is modeled in the load forecast; the effect is to change the peak load.)

*Recommendation: In the next IRP, the Department would like to see validation of the capacity factor contribution for both West and East wind, including operational data on wind plant output and its coincidence with LOLP. Geographic diversity of renewable generation is generally viewed by the Department as a positive development; for example, ODOE suggests collecting wind plant output data in areas of the West Balancing Authority Area outside of the Gorge and comparing potential capacity contributions from these areas.*

*Cost-competitive QF resources have a number of characteristics that provide value to Oregon, including diversity of ownership and geographic location, among other aspects. There is concern that some QFs in the West BAA may be financially harmed if the reduction in capacity contribution has been overestimated.*

3. Wind Repowering – The IRP indicates that multiple wind facilities will be repowered by the end of 2020. It is also indicated that permitting of the repowering projects is straightforward and that environmental impacts will be minimal, as the existing towers and foundations will remain in place. This may be true. However, larger turbine blades could cause increased environmental risks such as avian fatalities that may cause risks or delays to receiving permits. Additionally, the repowered wind facilities appear to be in a number of different states with potentially different permitting requirements. It is also possible that federal permits will need to be secured or modified to accommodate the repowering efforts. The Company states that the permitting process for the repowered sites will be simplified compared to new wind facility builds.



*Recommendation: In this IRP, ODOE would like the Company to provide additional and specific information related to a permitting plan for the repowered projects, including any local, state, and/or federal permitting requirements that may cause increased risk or delays to implementation of the repowering by the stated 2020 deadline.*

4. Transmission Build and the Energy Gateway 4 Portfolio – Late in the IRP development process, the company introduced a new portfolio that includes building 140 miles of 500-kV transmission line in Wyoming. The line is referred to as sub-segment D2 of the Energy Gateway project. The Company performed in-depth analysis on this new portfolio in a short time frame, with a significant portion of the analysis coming after the final public meeting in March. Therefore, stakeholders are reviewing some of the results for the first time in the April 2017 IRP filing. The GW4 portfolio has overwhelming present value revenue requirement (PVRR) benefits from various sources: increased transfer capability of the line itself, increased export capability for wind combined with lower wind installed cost assumptions, reduced losses on parallel lines resulting in increased annual energy flows, avoided de-rating during times of outages on nearby portions of the transmission system, and finally incremental benefits in the EIM.

With all these economic benefits for the GW4 portfolio, at the final public meeting stakeholders asked how any portfolio that did not include this transmission upgrade could compete. Even though only a few weeks remained to finalize the IRP, ODOE appreciates the company's response to stakeholder requests to model two of the renewable energy core cases (RE-1c and RE-2) with the GW4 elements included. The PVRR results were almost the same for all cases (difference on average of only \$60M for portfolios with total PVRR on the order of \$23B). Including PaR analysis, the final portfolios – RE-1c, RE-2 and GW4 – had similar risk profiles and very similar costs. "The risk-adjusted PVRR and other stochastic metrics among portfolios that include the Energy Gateway sub-segment

D2 transmission line in the final screening stage of the process are closely grouped, with an average variation in the risk-adjusted PVRR that is just 0.08% of the average system risk-adjusted PVRR.”<sup>2</sup>

*Recommendation: The Department would like more explanation on the choice of GW4, including 1100 MW of new wind, as the preferred portfolio, when delaying the build of some renewable resources (as is the case in RE-1c and RE-2) could reduce risk to ratepayers. Delaying build of some wind until after the action plan time period would result in deployment of renewable resources that are more technologically advanced, and likely cheaper on a per-MW basis (even considering the expiration of the PTC). ODOE wants stakeholders, including the Company’s ratepayers, to be confident in the final selection of the preferred portfolio and the necessity to include a segment of the Energy Gateway project in that portfolio. The speed at which the analysis on the transmission benefits was conducted, and the extremely close PVRR result for any portfolio that includes the GW4 element, raises questions about the robustness of this process and the appropriateness of the result. The strong preference for the GW4 portfolio, and its associated risks, should be further explained in this 2017 IRP.*

##### 5. Forecasted Low Load Growth and Correlation to Private Generation Assumptions

ODOE observes that the Company’s relatively flat load growth forecast (<1 percent annually) and the range of private generation assumptions may be correlated. Low prices offered to QFs, and the end of tax credits such as Oregon’s Residential Energy Tax Credit (RETC) (expected to sunset at the end of 2017), could result in lower private generation builds. Less private generation is the equivalent of increased loads. In the sensitivity analysis, the low private generation scenario (PG-1) resulted in higher costs to the Company. Conversely, the high private generation scenario (PG-2) resulted in lower costs to the Company. Using the assumptions in scenario PG-2, the Company, and by extension its ratepayers, save \$275M and utilize more renewable energy and less natural gas. If

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<sup>2</sup> PacifiCorp 2017 Integrated Resource Plan, April 4 2017, Volume I, p. 233

additional analysis were done on potential transmission system cost savings with high private generation, the savings might even be higher.

Targeted energy efficiency and DLC programs can reduce the risks associated with faulty load forecasts. Also, some private generation could be used to correct long-range load forecast errors; e.g. irrigation small hydro production typically drops to near zero in the winter, so this private generation resource could combine with EE/DLC to produce a “flatter” load shape.

*Recommendation: The Department encourages PacifiCorp to return to the high private generation scenario and run additional analysis in the next IRP. The net system benefits of targeted energy efficiency and DLC should also be examined in the next IRP.*

#### 6. Significant Changes to the Preferred Portfolio in the Final Stages of IRP Development

The 2017 IRP development process undertaken by PacifiCorp has incorporated about 12 months of public input to date, starting in June 2016. In only a few months, between late January and early April 2017, the preferred portfolio changed in many aspects that had not been discussed at previous public meetings. Most notably, the Company announced 905 MW of wind repowering and a new 140-mile 500-kV transmission line that enables a 3x increase in new renewables. Stakeholders had little time to analyze these new proposed resources before the final IRP was filed at the Oregon PUC on April 4, 2017. ODOE is concerned there are risks in the preferred portfolio that are not adequately analyzed nor addressed in the IRP.

At Public Meeting #7, attendees were told the company had finalized most assumptions for most inputs in November 2016. Therefore, many stakeholders, including ODOE, were caught off guard by the differences in the major elements of the draft preferred portfolio presented at the January Public Meeting #7, compared to the next draft preferred portfolio presented at the final Public

Meeting #8 in early March. Public Meeting #8 included the “unveiling” of the repowering portion of the portfolio. The Company continued to analyze and refine the GW4 element of the preferred portfolio and included new data and assumptions in the final IRP. ODOE provides the table below to highlight the differences in the elements of the portfolios between January and April 2017.

Core Case OP-1 Optimized Regional Haze Compliance Presented Jan. 26-27 2017, Public Mtg. #7			
Portfolio Elements	Study year 2026	Study year 2036	Portfolio Notes
New Renewables	229 MW (2021)	1671 MW	For RPS compliance
Coal Retirements	-667 MW	-2740 MW	Coal to NG for Naughton 3
DSM		1100 MW	
FOTs	1100 MW	800 MW	
Transmission			Not examined yet
PVRR		\$25,167M	
Draft Preferred Portfolio “OP-REP” Includes Wind Repowering Presented Mar. 2-3 2017, Public Mtg. #8			
Portfolio Elements	Study year 2026	Study year 2036	Portfolio Notes
New Renewables	428 MW (2021)	2187 MW	Mostly in PAC East
Wind Repowering	905 MW (2021)		Not a capacity addition
Coal Retirements	-749 MW	-3649 MW	Naughton 3 retired (no NG)
DSM		1261 MW	
FOTs	1031 MW / 354 MW	1654 MW	Summer / Winter FOTs
Transmission			GW4 portfolio ranked #2
PVRR		\$24,715M	
Final Preferred Portfolio “FS-GW4” Includes New Wind, Wind Repowering and Transmission Gateway 4 Filed Apr. 4 2017 in the Final 2017 IRP			
Portfolio Elements	Study year 2026	Study year 2036	Portfolio Notes
New Renewables	1100 MW (2021)	3859 MW	Wind + utility solar*
Wind Repowering	905 MW (2021)		Not a capacity addition
Coal Retirements	-749 MW	-3649 MW	Naughton 3 retired (no NG)
DSM		1231 MW	
FOTs	978 MW / 351 MW	1539 MW / 766 MW	Summer / Winter FOTs
Transmission	GW4 (2020)		140-mi 500-kV line
PVRR		\$23,808M	

\*Includes 30 MW of geothermal capacity in PAC-West

*Recommendation: The IRP Volume I, Ch. 9 Action Plan (p. 263), lists key uncertainties including load, distributed generation, CO<sub>2</sub> emissions policies, Regional Haze compliance*

*outcomes, and availability of purchases from markets. Left off this list is the uncertainty associated with the permitting and construction involved in repowering over 900 MW of existing wind plants and building 140 miles of 500-kV transmission line – all required to be online by the end of 2020. The Department would like to see a more thorough analysis and description of the potential timeline risks associated with the preferred portfolio in the 2017 IRP.*

### **Conclusion**

The Oregon Department of Energy appreciates the opportunity to submit these comments and the thoughtful engagement by PacifiCorp and the intervening parties.

DATED this 23<sup>rd</sup> day of June, 2017.

Respectfully submitted,

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/s/ Jesse D. Ratcliffe

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