BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

UE 356

In the Matter of	)
	)
PacifiCorp, dba Pacific Power	)
	)
2020 Transition Adjustment Mechanism.	)
	)

REDACTED OPENING TESTIMONY
OF THE
OREGON CITIZENS' UTILITY BOARD

June 10, 2019

CUB
EST. 1984

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OF OREGON

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In the Matter of PacifiCorp, dba Pacific Power. 2020 Transition Adjustment Mechanism.	))))))	OPENING TESTIMONY OF THE OREGON CITIZENS' UTILITY BOARD

Q. Please state your name, occupation, and business address.

A. My name is Bob Jenks. I am the Executive Director of by Oregon Citizens' Utility Board (CUB). My business address is 610 SW Broadway, Ste. 400 Portland, Oregon 97205.

Q. Please describe your educational background and work experience.

A. My witness qualification statement is found in exhibit CUB/101.

Q. What is the purpose of your testimony?

A. I respond to issues raised in the Opening Testimony of PacifiCorp (PAC) or the Company witness Michael G. Wilding.

Q. What issues does your testimony address?

A. My Testimony addresses the following issues:

1) Modeling Changes in the Transition Adjustment Mechanism

2) Hourly Scalars to the Forward Price Curve

I. Modeling Changes - Generally

Q. Explain CUB's concerns that PacifiCorp's Modeling Changes are not making the model more accurate?

A. PacifiCorp used to be explicit that it was proposing modeling changes because the Company was under-recovering its Net Power Costs. For example, in the 2016 TAM, the Company claimed that modeling changes were necessary because, since 2007, "the Company's actual NPC required to serve customers have exceeded the forecast included in TAM filings."[1] That is the year that the Company proposed the DA/RT adjustment along with several other modeling changes. However, in 2016, after these modeling changes, the Company over-recovered its NPC by $60,189.[2] In addition, the Company has now provided two backcasts of its NPC forecasting model. This year, it backcast 2017 and found a variance of 0.3%.[3] Last year, the Company did a backcast of 2016 and found it to be even more accurate with a variance of 0.03% or $400,000.[4]

CUB is concerned that the Company's modeling changes are primarily one-sided changes to the benefit of shareholders, which will increase power costs to customers. This may have made sense before 2016, because the power cost model was consistently under-forecasting power costs. Today, however, the model works well to forecast costs, and one-sided modeling changes could introduce bias into the model.

[1] UE 296 – PAC/100/Dickman/22
[2] UE 327, PacifiCorp's Initial Application, page 1.
[3] UE 356 - PAC/100/Wilding/33.
[4] UE 339 - PAC/100/Wilding/19.

Q. The Company claims that these modeling changes improve the modeling of certain elements of their power costs. Does CUB dispute this?

A. Yes. CUB indeed has concerns about the changes to forecasting EIM benefits and to the new approach to the use of scalars in this proceeding. But, even if CUB did consider individual changes to be reasonable, the one-sidedness of the modeling changes could be making the overall results less accurate. Any model has some flaws, inaccuracies, and simplifying assumptions that cause the model to be biased in one direction or the other. In this case, biased in favor of customers or shareholders. The Company's modeling changes mostly correct supposed flaws that are biased in favor of customers. CUB's concern is that if the model is reasonably balanced – and the two Company-conducted backcasts suggest the model to be reasonably balanced – then the Company's focus on rooting out "flaws" that are biased towards customers will make the model biased in favor of shareholders.

Q. Are the modeling changes one sided?

A. Yes. Below are the modeling changes proposed by the Company in the last two TAM proceedings. These years are after the 2016 PCAM demonstrated that the model was no longer leading to the under-recovery of power costs. In the 2019 TAM, the Company proposed modeling changes that benefited both customers and shareholders. However, overall, the proposed modeling changes benefited shareholders by approximately $14 million. This year, the Company is proposing modeling changes that benefit shareholders by more than $22 million.

2020 TAM Modeling Changes[5]

Modeling Change	Customer Benefit	Shareholder Benefit
EIM forecast		[redacted]
Scalars		4,707,509
Solar Shaping		916,057
GRID topology	17,009	
Total	$17,009	$22,623,566

2019 TAM Modeling Changes[6]

Modeling Change	Customer Benefit	Shareholder Benefit
EIM forward trend line		10,900,000
Wind Capacity Factor		4,644,500
Regulating Reserves	3,223,732	
Variable O&M in coal dispatch		1,796,024
Economic Cycling of coal	740,681	
Pioneer Wind QF shape		522,288
Total	$3,964,413	$17,862,812

Q. What is CUB's recommendation regarding modeling changes?

A. There is no reason that modeling changes need to occur every year. Now that the model has been demonstrated to be reasonably accurate, CUB recommends that PacifiCorp adopt Portland General Electric's (PGE) approach to modeling. In 2007, after years of controversy with PGE's modeling changes, the Commission ordered PGE to stop making modeling changes in its annual power cost filing and to instead propose modeling changes in dockets that had a longer schedule such as

[5] EIM source: UE 356 - PAC/100/Wilding/27 Confidential; Scalars, Solar Shaping and GRID topology source: UE 356 - PAC/107/Wilding/1

[6] EIM source: UE 339 - PAC/100/Wilding/41; Regulating Reserves, Variable O&M, Economic Cycling and Pioneer Wind QF source: UE 339 - PAC/108/Wilding/1

a General Rate Case (GRC). Since that order, PGE has made limited modeling changes to years in which it has a GRC.

While the Commission has declined to adopt a similar requirement in the past for PacifiCorp, it was always in the context that PacifiCorp was systematically under-recovering its power costs. Now that the model has been demonstrated to be accurate, there is no reason to constantly change it.

The one exception is that CUB would allow modeling changes to occur outside of a GRC when it was in response to changing circumstances that require a modeling change. For example, if PacifiCorp was to join a day-ahead regional market, the dispatch of their generating assets changes and the forecast of that dispatch would also have to change.

II. Hourly Scalars to the Forward Price Curve

Q. What is the modeling change that the Company is proposing for hourly scalars?

A. PacifiCorp's forward price curve produces average monthly prices. Scalars are used to shape those monthly prices into hourly prices. Previously, the Company had used five years of historical hourly prices from PowerDex. The modeling change that PacifiCorp is proposing is to use CAISO day ahead prices at COB and Palo Verde from the most recent 12-month period.[7]

[7] UE 356 – PAC/100/Wilding/19.

Q. What is CUB's view on this modeling change?

A. CUB opposes the Company's modeling change. The Company has failed to demonstrate that it will improve the models forecasting of forward market prices. The Company provides little evidence to support the idea that using 12-months of data is better than using 5 years of data; the Company offers no evidence to support the idea that CAISO hourly prices at COB are the most accurate method to forecast Mid-C forward prices.

Q. What is wrong with how the Company argues this will improve the model?

A. The Company compares the scalars using the historic PowerDex methodology and its new CAISO methodology and then asserts that "as seen in the charts, the updated scalers (red line) produces a more reasonable shape.[8]" The Company claims that with increasing solar penetration the CAISO methodology "better reflects" market conditions. But it offers no empirical evidence that the CAISO methodology produces a better price forecast.

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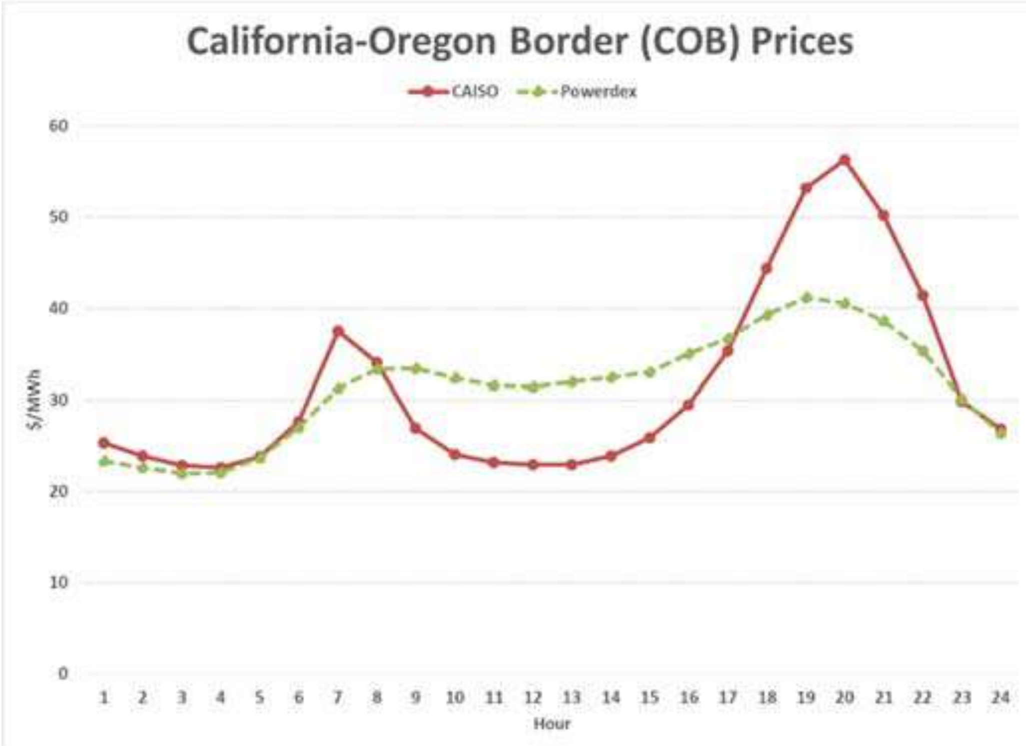
[8] UE 356 – PAC/100/Wilding/20

Here is the chart for hourly prices at the California-Oregon Border (COB)[9]:



The Company believes it is obvious that the red line is more accurate. The red line certainly reflects California's Duck Curve, which has a significant effect on California prices. However, if net load doubles between midday and early evening, this does not mean that prices double. Much of the price response will depend on available capacity. The green line in the chart may better represent the prices during periods of available capacity.

Q. Explain your concern with using 12-months of data rather than 5 years?

A. Power costs forecasts are generally normalized. This means that we are trying to forecast what prices will be under average, normal conditions. Using multiple

[9] UE 356 – PAC/100/Wilding/20

years of data is one way to ensure that unusual events are not affecting the forecast. Generally, 12 months of data will be more likely to be influenced by unusual events that 60 months of data. A single year can be heavily influenced by hydro conditions, extreme weather, transmission constraints, natural gas constraints, plant outages and other unusual events. The Company has attempted to “normalize” this 12-months of data by placing a $250/MWh price cap and a -$50/MWh price floor.[10] However, the Company offers no evidence that this will effectively normalize the data and that this is an appropriate cap and floor and offers no evidence that this is the correct cap and floor. For example, would a cap of $200 and a floor of -$25 be more effective in normalizing this data and forecasting future prices?

Consider hydro conditions. Below are two charts from Clearing Up which show BPA’s loads and resources.[11] The first is from the last week of May of 2019 and the second is from a week that straddles August/September of 2018. In May of 2019, the hydro line is well above BPA’s load which means that the hydro system has excess capacity that is being used to respond to regional loads. At the end of the summer in 2018, hydro capacity was much more limited and hydro production was not well above BPA’s load. In turn this hydro capacity affects prices.

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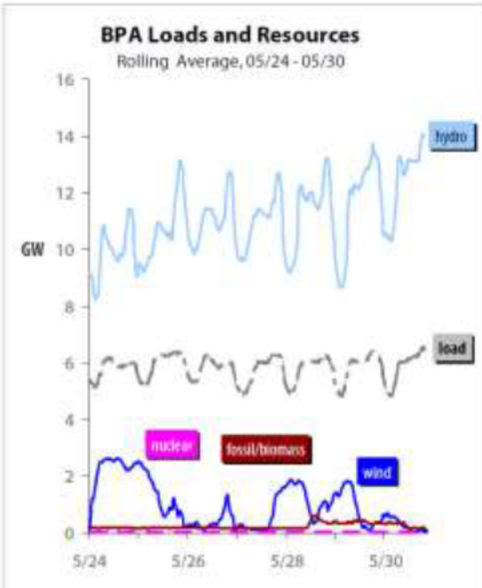
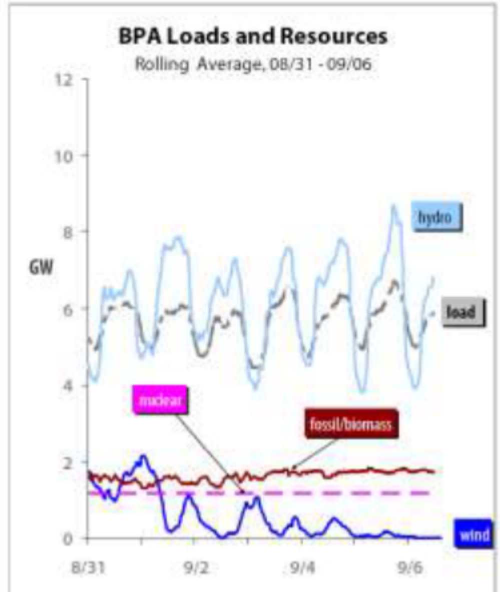
[10] UE 356 - PAC/100/Wilding/22
[11] Clearning Up, May 31, 2019, page 5; Clearing Up, September 7, 2018, page 7.

May 2019



August/September 2018



Hydro doesn't just vary by season; it varies significantly by year. Using a single year of data, means that a single year of hydro is used. CUB is concerned that the scalars based on a single year will not reflect normalized hydro conditions which is important when forecasting prices in the Pacific Northwest.

Q. Explain your concern with using COB prices to forecast Mid-C prices.

A. PacifiCorp is using the CAISO COB prices to forecast prices for the PacifiCorp West Balancing Authority.[12] [redacted] [13] There are differences between Mid-C and COB. Mid-C reflects the prices associated with a winter-peaking territory rather than California's summer peak. Mid-C also reflects a resource mix that includes a great

[12] CUB Exhibit 102.
[13] CUB Confidential Exhibit 103.

deal of hydro and wind, whereas California's resources are increasingly dominated by solar.

Q. What is CUB's recommendation with regards to hourly scalars?

A. CUB recommends that the Commission reject this modeling change. The Company has failed to show that it will improve its price forecasts, that it reasonable normalized or that it reflects the trading activity that the Company conducts in its Western Balancing Authority.

III. Conclusion

Q. Does this conclude your testimony?

A. Yes.

WITNESS QUALIFICATION STATEMENT

NAME: Bob Jenks

EMPLOYER: Oregon Citizens' Utility Board of Oregon

TITLE: Executive Director

ADDRESS: 610 SW Broadway, Suite 400
Portland, OR 97205

EDUCATION: Bachelor of Science, Economics
Willamette University, Salem, OR

EXPERIENCE: Provided testimony or comments in a variety of OPUC dockets, including UE 88, UE 92, UM 903, UM 918, UE 102, UP 168, UT 125, UT 141, UE 115, UE 116, UE 137, UE 139, UE 161, UE 165, UE 167, UE 170, UE 172, UE 173, UE 207, UE 208, UE 210, UE 233, UE 246, UE 283, UG 152, UM 995, UM 1050, UM 1071, UM 1147, UM 1121, UM 1206, UM 1209, UM 1355, UM 1635, UM 1633, and UM 1654. Participated in the development of a variety of Least Cost Plans and PUC Settlement Conferences. Provided testimony to Oregon Legislative Committees on consumer issues relating to energy and telecommunications. Lobbied the Oregon Congressional delegation on behalf of CUB and the National Association of State Utility Consumer Advocates.

Between 1982 and 1991, worked for the Oregon State Public Interest Research Group, the Massachusetts Public Interest Research Group, and the Fund for Public Interest Research on a variety of public policy issues.

MEMBERSHIP: National Association of State Utility Consumer Advocates
Board of Directors, OSPIRG Citizen Lobby
Telecommunications Policy Committee, Consumer Federation of America
Electricity Policy Committee, Consumer Federation of America
Board of Directors (Public Interest Representative), NEEA

OPUC Data Request 11

OFPC Scalars - Based on the information available in the response to Staff DR10, please provide a narrative explanation why the Company believes the historical prices at COB and Palo Verde as opposed to other markets represent a reasonable proxy by which market prices are shaped in GRID.

Response to OPUC Data Request 11

The California Independent System Operator (CAISO) reports day-ahead prices for the market hubs at Malin (California-Oregon Border (COB)) and NP15 in the west, and Palo Verde (PV), Mona and SP15 in the east. CAISO does not report data for the Mid-Columbia (Mid-C) market hub. Therefore, COB is recommended as the basis to create price scalars for the PacifiCorp West (PACW) BAA, and PV is recommended as the basis to create price scalars for the PacifiCorp East (PACE) BAA. The shape of hourly prices in each balancing authority area (BAA) show little differentiation. More specifically, CAISO scalars shows that the winter and summer scalars for Malin (COB) and NP15 are a similar shape. Likewise, the winter and summer scalars for PV, Mona and SP15 are a similar shape.

Exhibit 103 is confidential and will be provided to parties who have signed protective order 16-128.

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Q. Please state your name, occupation, and business address.

A. My name is William Gehrke. I am an Economist employed by Oregon Citizens' Utility Board (CUB). My business address is 610 SW Broadway, Ste. 400 Portland, Oregon 97205.

Q. Please describe your educational background and work experience.

A. My witness qualification statement is found in exhibit CUB/201.

Q. What is the purpose of your testimony?

A. I respond to several issues raised in the Opening Testimony of PacifiCorp (PAC or the Company) witness Michael G. Wilding.

Q. What issues does your testimony address?

A My testimony addresses the following issues:

1) Incremental Benefits from Energy Imbalance Market (EIM) Inter-Regional Dispatch (EIM Benefits)

2) Wind Capacity Factors and Production Tax Credit (PTC) benefits.

I. EIM Benefits

Q. What statements has the Company made about the EIM benefits customers receive?

A. The Company has made the following statements:

1. "EIM benefits have increased each year, primarily as a function of increased market participation."[1]
2. "Participation [in the EIM] has slowed."[2]
3. "[T]he [EIM] market has matured, prevailing market prices have been shown to be the primary driver of EIM benefits."[3]

Q. What is your response to the Company's first statement?

A. CUB agrees that, on a calendar year basis, total EIM benefits have increased each year for PacifiCorp. There is also increased market participation in the EIM, as demonstrated below in the confidential chart below. The blue line in this figure is PAC's actual EIM benefits.

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[1] UE 356 – PAC/100/Wilding/26/ Lines 11-12.
[2] UE 356 – PAC/100/Wilding/26/ Lines 12.
[3] UE 356 – PAC/100/Wilding/26/ Lines 12-13.

[redacted]

Q. What is your response to the Company's second statement?

A. The Company's second statement is that that participation in the EIM has slowed. As of April 2019, the Salt River Project and Seattle City Light are planned to join the western EIM in 2020. Northwestern Energy, the Public Service Company of New Mexico and the Los Angeles Department of Water and Power are planned to enter the EIM in 2021. In 2022, Avista is due to join the EIM. From CUB's standpoint, EIM participation is still increasing.

Q. Have any utilities joined the EIM recently?

A. Yes, Powerex and Idaho Power joined the Western EIM in the year 2018.

Q. How have additional market participants effected the transfer capacity of the EIM?

A. As more participants have been added to the EIM, the footprint of the Western EIM increases. CUB Exhibit 202 indicates in a chronological order the growth in the footprint of the EIM from 2016 to 2018.

Q. What is your response to the Company's third statement?

A. The Company's third statement is that the EIM market has matured, prevailing market prices have been shown to be the primary driver of EIM benefits. Based on the growth EIM has experienced and will experience over the next three years, CUB does not believe that the EIM market has completely matured. In discovery, the Company has characterized the EIM has an evolving market, which contradicts the assumption of market maturity made by the Company in testimony.[4] CUB will address the importance of the assumption that market prices are a primary driver of EIM benefits when CUB discusses the Company's modeling approach.

Q. How does the Company model EIM benefits?

A. [redacted]

Q. What did the Company say about the accuracy of the model?

[4] CUB Exhibit 203.

A. The Company compares the 2020 model to the 2019 model. The Company states the 2020 TAM forecast matches up with actual results better than the 2019 TAM. The Company implies that the 2020 TAM model will be more accurate in forecasting TAM benefits.

Q. What is difference between ordinary least squares (OLS) and weighted least square (WLS)?

A. OLS is a method for estimating unknown parameters in a linear regression model. The objective of the OLS is to estimate parameters between independent variables and dependent variables, which minimizes the mean square error of the linear regression model. WLS estimate parameters that minimize the weighted mean square error. One potential problem with WLS regressions are that the regression is sensitive to weights applied when the regression is estimated.

Q. Which regression estimation technique did the Company use?

A. [redacted]

Q. Why does the model used in the 2020 TAM model match actual results closer compared to the 2019 TAM model?

A. [redacted]

Q. What assumption does the Company make in its initial filing?

A. The Company assumes that the EIM market is mature. CUB reads the Company's testimony to mean that PAC assumes that PAC's EIM benefits are stationary. A time series is a series of data over a period of time. If one were to assume that a time series is stationary, that would mean that the statistical properties of a process generating a time series does not change over time. [redacted] In CUB's experience with time series, the use of non-stationary data in a linear regression has the potential to estimate spurious regressions. Typically, time-series data is differenced to address non-stationary data.

Q. What about the use of market prices in the forecast of EIM benefits?

A. The Company asserts that gas prices and electricity prices are drivers of EIM benefits, with only three years of data available to estimate the impact of gas price and electricity. CUB believes that it premature to use monthly price data to estimate EIM benefits. Three years of data is insufficient.

Q. What modeling approach would CUB propose for EIM data if more data was available?

A. CUB would recommend that Company not use OLS or WLS regressions for forecasting EIM benefits in future TAMs. CUB proposes that a workshop about the EIM benefits forecast be hosted prior to the filing of the 2021 TAM to talk through potential modeling approaches.

Q. What modeling approach does CUB recommend to estimate 2020 EIM benefits?

A. CUB recommends that an exponential smoothing model be used for the 2020 TAM. This model, which is a univariate model, takes the exponential moving average of actual EIM margin. An exponentially weighted moving average (EWMA) forecast decreases the weights of the observations as it gets older.

Q. When does CUB's model start?

A. CUB's model starts in December 2015. This starting point is consistent with previous Company testimony. In UE 339, the Company excluded historical data prior to December 2015 to account for the steep learning curve experienced by the Company from participating in a new market.[5] Prior to December 2015, PacifiCorp and CAISO were the only participants in EIM.[6],[7]

Q. What is advantage of the EWMA models?

A. The primary advantage of EWMA models is that one does not have to have use stationary data. Since there is limited data, a small dataset would be truncated if differenced. The second advantage of EWMA is that recent data is weighed more than less recent data, which is important in an evolving market, like the EIM. [8]

Q. What is the projected inter-regional benefit associated with the EWMA forecast?

A. The total interregional benefit associated with CUB's approach is an [redacted] in 2020 on a system basis. This is a preliminary estimate; CUB is open to updating the EWMA forecast with additional data in the future.

Q. Does CUB have any additional comments on the modeling EIM benefits?

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[5] UE 339 – PAC/100/Wilding/7/Lines 2-4.
[6] UE 339 – PAC/100/Wilding/7/Lines 4-5.
[7] CUB Exhibit 204.
[8] CUB Exhibit 203.

A. There is limited historical data to evaluate EIM benefits. As new information is provided, CUB will evaluate the relevance of alternative forecasting techniques. CUB would like the most accurate and reasonable forecast be included in TAM rates, as this is the Commission's goal in the TAM .[9]

II. Production Tax Credit Floor

Q. Please summarize your proposal.

A. CUB proposes the imposition of a Production Tax Credit (PTC) floor on the Company's repowered wind projects with a duration of ten years. CUB proposes that the PTC floor be tied to the expected generation assumed by the Company in its February 2018 analysis.[10] Importantly, CUB is proposing a floor on the PTC production rather than a blanket imputation of the PTC values in the TAM. If a PTC floor is imposed on the repowered wind projects, CUB would not oppose the Company's methodology (50/50 blend) for projecting the wind capacity factor for repowered projects.

Q. What are PTCs?

A. PTCs are federal income tax credits given to facility owners based on the generation output of a wind generation facility. PTCs are limited to the first ten years of generation. Repowered wind generation facilities can requalify for PTCs—i.e., extend the PTC benefits for ten years—if repowering costs equal at least four times the fair market value of the equipment that the owner retains from the

[9] OPUC Order No. 16-482 at 2.
[10] UE 352 – PAC/204/Hemstreet/1

original facility.[11] Therefore, 80 percent of the fair market value of the repowered wind turbine generator must result from repowering project costs while the value of the retained components cannot exceed 20 percent of the fair market value of the new facility.[12] The per kWh tax credit in 2018 was $0.023.

Q. What major project is PacifiCorp currently working on?

A. The Company is repowering a majority of its wind generation facilities. The principal benefit to customers from repowering is the wind generation requalifying for wind PTCs. [13]The Company is seeking to repower the following facilities for inclusion in Oregon rates in docket UE 352:

1. Glenrock I
2. Glenrock III
3. Seven Mile Hill I
4. Seven Mile Hill II
5. High Plains
6. McFadden Ridge
7. Dunlap
8. Marengo I
9. Marengo II
10. Goodnoe Hills
11. Leaning Juniper

[11] UE 352 – PAC/200/Hemstreet/9.
[12] UE 352 – PAC/200/Hemstreet/9.
[13] UE 352- Staff/100/Storm/34.

Q. What wind plant generation increase does the Company expect from repowering?

A. CUB Exhibit 205 details the expected increase in generation from wind repowering. The Company expects that repowering would increase generation from of its wind resource on average by 26.7%.[14]

Q. What is the quantity risk that CUB is concerned about?

A. CUB is concerned that the repowered wind facilities may not perform at the level of expected generation projected in the Company's February 2018 analysis.

Q. Why is the CUB concerned about the quantity risk associated with this project?

A. CUB does not want customers to bear the risk associated with repowering this investment. If repowered wind generation underperforms the Company's projections, the projected level of PTCs would decrease overtime. Therefore, customers would realize fewer benefits than what the Company included in the analysis that led to Commission acknowledgement of this project. It will be several years before the results of wind repowering is evident to the Commission.

Q. Who receives the benefit of PTCs?

A. Customers receive the monetary benefits of PTCs not the Company.

Q. What benefits do the Company's shareholders receive?

A. Regardless of the level of generation—and, therefore, PTCs—that the facilities realize, shareholders stand to benefit tremendously from the capital expenditures

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[14] UE 352 – PAC/100/Lockey/Page 2/Lines 6-7.

necessary to finish the repowering project. The Company earn a rate of return on the capital investment throughout the life of project.

Q. Is the benefit to shareholders guaranteed? How about the benefit to customers?

A. While shareholders are guaranteed to benefit from a new profit stream, unless a floor is placed on the PTCs, there is no similar guarantee that benefits will flow to customers.

Q. What is the link between the capacity factor of a wind facility and the expected production tax credits of a wind facilities?

A. As noted by the Company, PTC benefits are a function of the wind facility's capacity factor. CUB's understanding of past TAM proceedings is that, prior to the 2019 TAM, the Company used P50 production estimates to forecast capacity factors. In the 2019 TAM, the Company proposed to use cumulative historical averages to forecast wind plant performance and attendant PTCs. As part of a stipulation in the 2019 TAM that was adopted by the Commission, parties agreed to a 50/50 blend of the (1) P50 production estimates and (2) cumulative historical averages of wind generation.[15] In this proceeding, the Company proposes to continue forecasting capacity factors and PTCs using the same methodology.

Q. What is the impact of including the cumulative historical average of wind generation?

A. The inclusion of the cumulative historical average of wind generation allows Company to update PTCs annually in the TAM. If the repowered wind generation

[15] OPUC Order No. 18-421 at 4.

underperforms relative to the Company's projections, then the Company can reduce the amount of forecasted PTCs in the TAM each year.

Q. Under the Company's proposal, who bears the quantity risk associated with repowering?

A. Customers would bear the risk of the underproduction of the wind turbines. Oregon ratepayers have a ten-year window to receive the benefits of PTCs. Once a repowered generation plant has been in service for 10 years, the wind plants no longer qualifies for PTCs. If the actual generation results of repowering are lower than the cumulative average of wind generation, the Company would project a lower PTC credit in future TAM proceedings.

Q. What did OPUC Order No. 18-138 say about production risk from PAC's wind repowering and other Energy Vision 2020 action items?

A. In PAC's 2017 IRP, the Commission stated that "[f]or uncertainties that may persist beyond project commercial operation date (post-COD risks), such as project performance . . . [w]e intend to ensure that customer risk exposure is mitigated appropriately, and recovery may be structured to hold PacifiCorp to the cost and benefit projections in its analysis."[16]

Q. Why does CUB recommend that the Commission impose a floor on the PTC values?

A. CUB believes that the Company should be held to its February 2018 analysis. In Order No. 18-138, the Commission clearly articulated that it intended to ensure mitigating customer risk by holding the Company to its cost and benefit

[16] OPUC Order 18-138 at 8.

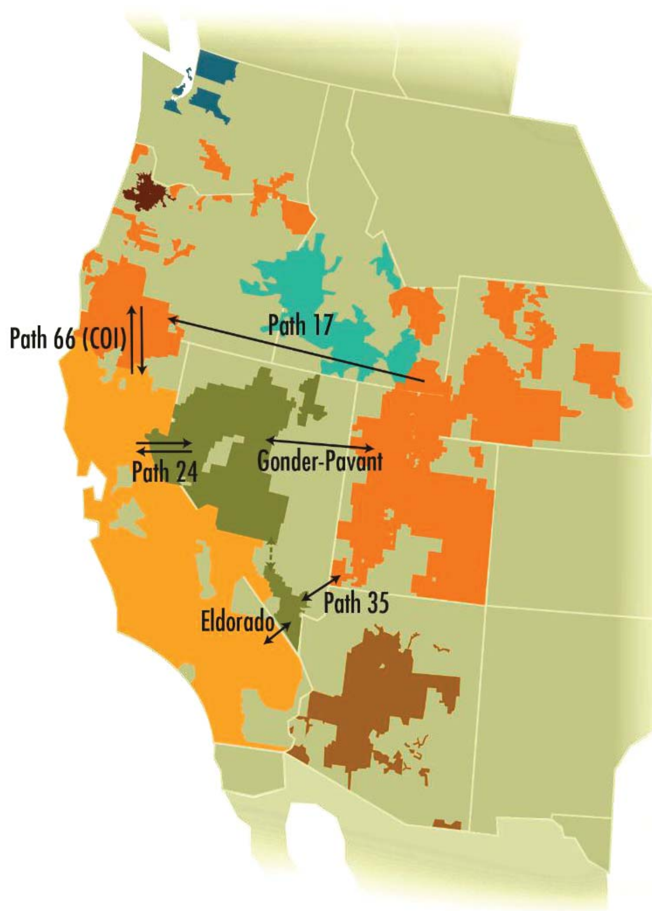
projections. CUB's proposal does just that. In the absence of a PTC floor, customers risk receiving benefits that are below what PAC projected while they pay for profits that will flow to shareholders regardless of generation outcome. On average, over ten years' generation of wind facility should match the Company's February 2018 analysis. To CUB, a ten-year PTC floor is reasonable because it would protect customers from the risk of under generation and is a time limited reasonable shift of risk. CUB's reasoning and proposal aligns with the Commission's vision in Order No. 18-138.

Q. Does this conclude your testimony?

A. Yes.

WITNESS QUALIFICATION STATEMENT

NAME:	William Gehrke
EMPLOYER:	Oregon Citizens' Utility Board
TITLE:	Economist
ADDRESS:	610 SW Broadway, Suite 400 Portland, OR 97205
EDUCATION:	MS, Applied Economics Florida State University, Tallahassee, FL BS, Economics Florida State University, Tallahassee, FL
EXPERIENCE:	Provided testimony or comments in several Oregon Commission dockets. Worked as an Economist for the Florida Department of Revenue. Worked as Utility Analyst at the Florida Public Service Commission, providing advice on rate cases and load forecasting. Attended the Institute of Public Utilities Annual Regulatory Studies program in 2018.



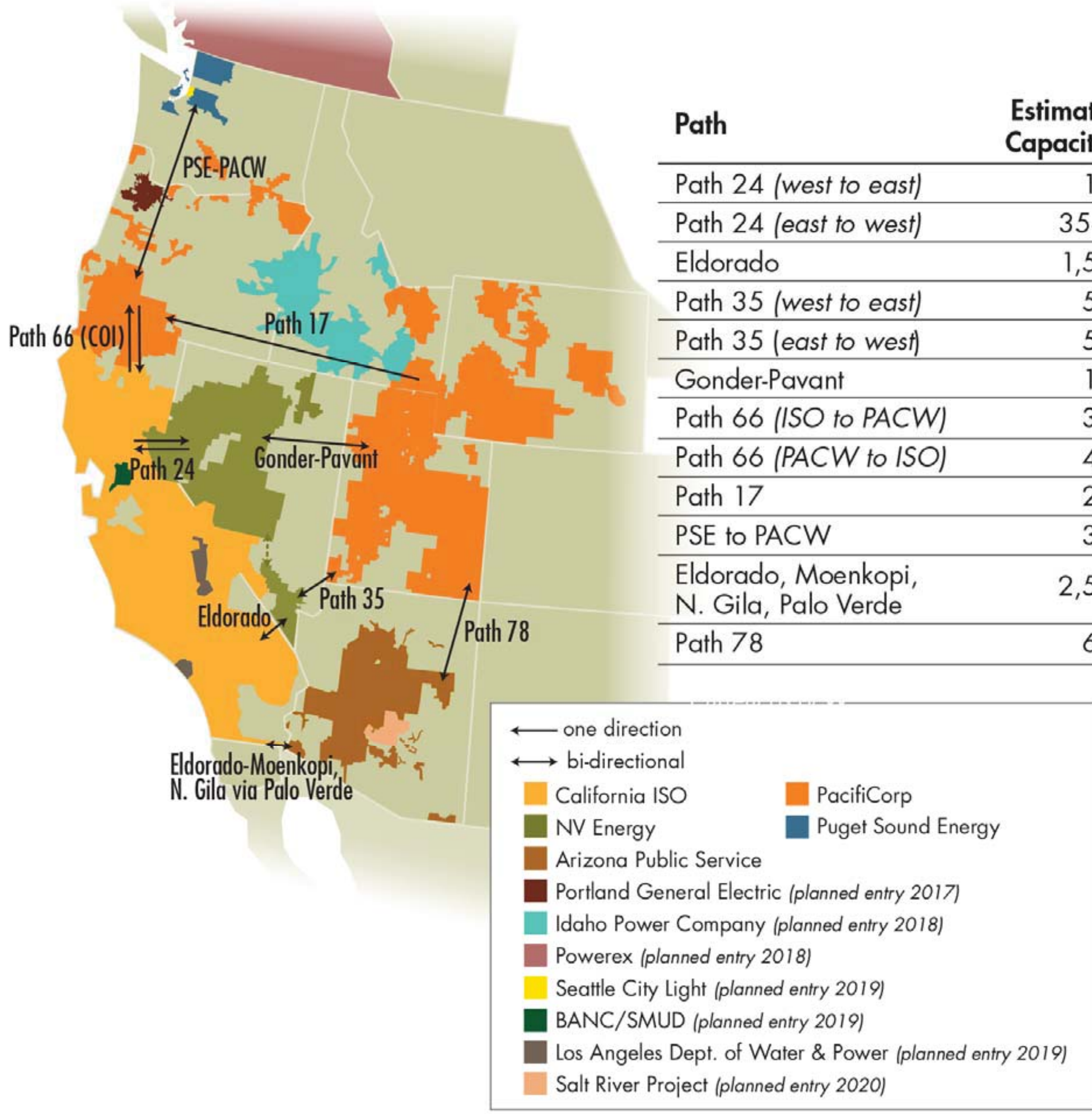
Path	Estimated Max Capacity (MW)*
Path 24 *(west to east)*	100
Path 24 *(east to west)*	35-90
Eldorado	1,500
Path 35 *(west to east)*	580
Path 35 *(east to west)*	538
Gonder-Pavant	130
Path 66 *(ISO to PACW)*	331
Path 66 *(PACW to ISO)*	432
Path 17	200

Graph 1: Estimated maximum transfer capacity

Reduced Renewable Curtailment and GHG Reductions

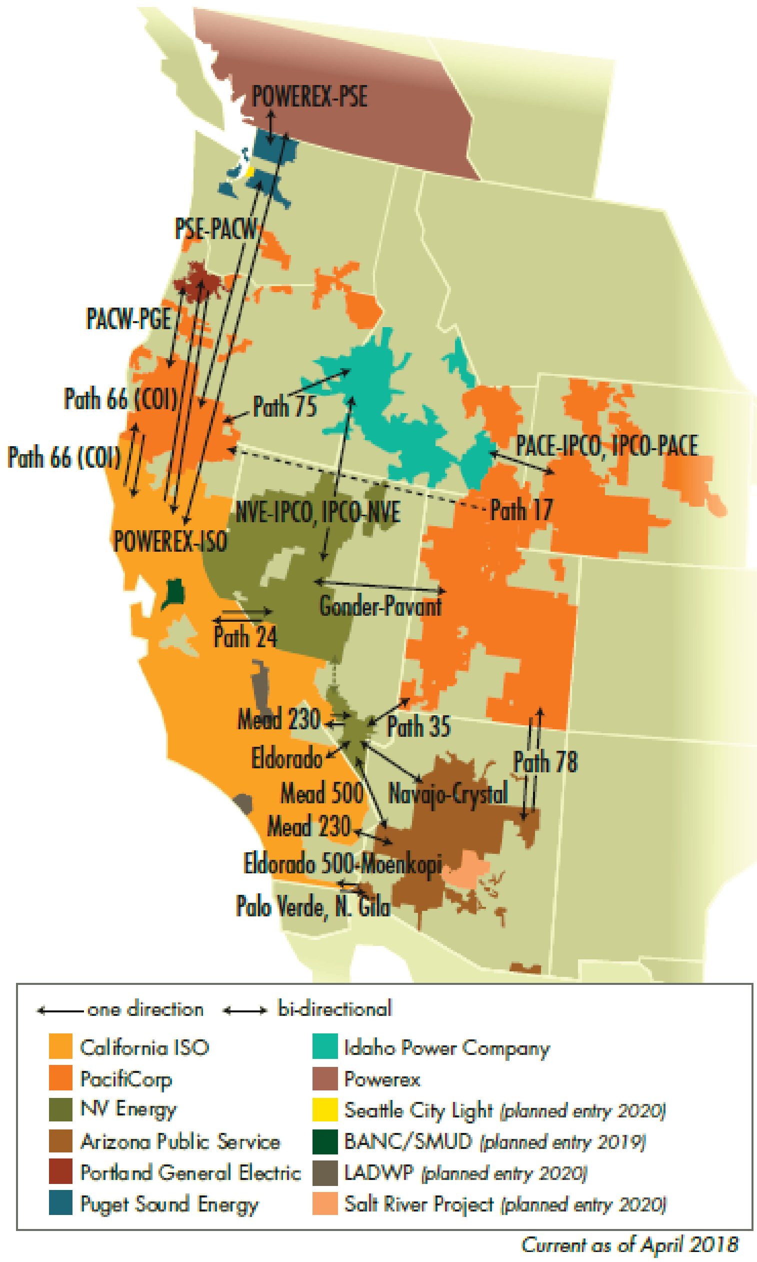
The EIM benefit calculation includes the economic benefits that can be attributed to avoided renewable curtailment within the ISO. If not for energy transfers facilitated by the EIM, some renewable generation located within the ISO would have been curtailed via either economic or exceptional dispatch. The total avoided renewable curtailment volume in MWh for Q3 2016 was calculated to be 11,915 MWh (July) + 6,050 MWh (August) + 15,129 MWh (September) = 33,094 MWh total.

The environmental benefits of avoided renewable curtailment are significant. Under the assumption that avoided renewable curtailments displace production from other resources at a default emission rate of 0.428 metric tons CO_2/MWh, avoided curtailments displaced an estimated 14,164 metric tons of CO_2 for Q3 2016. Avoided renewable curtailments also may have reduced the volume of renewable credits that would have been retracted. However, this report does not quantify the additional value in dollars associated with this benefit. Total estimated reductions in the curtailment of renewable energy along with the associated reductions in CO_2 are shown in Table 3.



Path	Estimated Max Capacity (MW)*
Path 24 *(west to east)*	100
Path 24 *(east to west)*	35-90
Eldorado	1,500
Path 35 *(west to east)*	580
Path 35 *(east to west)*	538
Gonder-Pavant	130
Path 66 *(ISO to PACW)*	331
Path 66 *(PACW to ISO)*	432
Path 17	200
PSE to PACW	300
Eldorado, Moenkopi, N. Gila, Palo Verde	2,500
Path 78	600

Graph 1: Estimated maximum transfer capacity (EIM entities operating in Q3)



Path	Estimated Max Capacity (MW)
Path 24 *(west to east)*	100
Path 24 *(east to west)*	35-90
Eldorado	797
Path 35 *(west to east)*	580
Path 35 *(east to west)*	538
Gonder-Pavant	130
PACW to PGE	320
Path 66 *(ISO to PGE)*	627
Path 66 *(PGE to ISO)*	296
Path 66 *(ISO to PACW)*	331
Path 66 *(PACW to ISO)*	432
Path 17	0-400* **
PSE to PACW	300
Eldorado 500-Moenkopi	732
Palo Verde, N. Gila	3,151
Path 78 *(PACE to APS)*	625
Path 78 *(APS to PACE)*	660
Navajo-Crystal	522
Mead 500	349
Mead 230 *(APS <-> ISO)*	236
Mead 230 *(ISO to NVE)*	3,443
Mead 230 *(NVE to ISO)*	3,476
IPCO to PACW (Path 75)	1,500
PACW to IPCO (Path 75)	400-510
PACE to IPCO	2,557
IPCO to PACE	1,550
NVE to IPCO	262
IPCO to NVE	390-478
Powerex <-> PSE	150
Powerex <-> ISO	150

** Is an optional path available for PACE-PACW EIM transfers and the capacity is a subset of PACE-IPCO/IPCO-PACE and Path 75 capacity.*

*** When in use, the available capacity on PACE-IPCO/IPCO-PACE and Path 75 will be subsequently reduced by the used amount on Path 17, and not double counted.*

GRAPH 1: Estimated maximum transfer capacity (EIM entities operating in Q3 2018)

WHEEL THROUGH TRANSFERS

As the footprint of the EIM grows and continues to change, wheel through transfers may become more common. Currently, an EIM entity facilitating a wheel through receives no direct financial benefit for facilitating the wheel; only the sink and source directly benefit. As part of the EIM Consolidated Initiatives stakeholder process, the ISO committed to monitoring the wheel through volumes to assess whether, after the addition of new EIM entities, there is a potential future need to pursue a market solution to address the equitable sharing of wheeling benefits. The ISO will continue to track the volume of wheels through in the EIM market in the quarterly reports. In order to derive the wheels through for each EIM BAA, the ISO uses the following calculation for every real-time interval dispatch:

CUB Data Request 11

Refer to CUB 1, please provide a narrative explanation for the Company including a weight option in its linear regression models for PACE and PACW export.

Response to CUB Data Request 11

PacifiCorp includes a weight option in the model because in an evolving market more recent data tends to be more relevant to the forecast than less recent data. The weight option is an attempt to capture this changing relationship over time and provide a reasonable forecast of benefits. As the underlying data is updated with new information, PacifiCorp will continue to evaluate the relevance of independent variables, as well as regression modeling methods, to produce the most accurate forecast.

CUB Data Request 12

Refer to PAC response to CUB 1, please provide narrative explanation of the Company including the Bilaterial_EIM dummy variable in PACE.

Response to CUB Data Request 12

The "Bilateral_EIM" dummy variable represents a one-time step change that occurred in the market beginning December 2015. At the onset of the energy imbalance market (EIM) the only participants were the California Independent System Operator (CAISO) and PacifiCorp. At that time, in the EIM, PacifiCorp East (PACE) was able to send energy only to PacifiCorp West (PACW). With the entry of Nevada Energy (NVE) in December of 2015, PACE gained the ability to export and import energy to and from NVE and consequently was able to realize inter-regional transfer benefits with other non-PacifiCorp balancing authority areas (BAA).

PacifiCorp Wind Fleet Repowering

Wind Project	Current Long-Term Generation	Project Generation Increase	Repowered Project Generation
[1]	[2]	[3]	[4]
[Units]	*[MWh]*	*[%]*	*[MWh]*
Glenrock I	303,723	21.7%	369,722
Glenrock III	113,438	20.7%	136,863
Seven Mile Hill I	339,195	23.0%	417,244
Seven Mile Hill II	71,224	22.8%	87,477
High Plains	306,145	24.9%	382,406
McFadden Ridge	93,101	25.3%	116,647
Dunlap I	389,045	22.5%	476,735
Marengo I	360,279	35.5%	488,214
Marengo II	166,742	39.4%	232,421
Goodnoe Hills	220,898	28.4%	283,699
Leaning Juniper	233,592	38.3%	299,745

Source: UE 352/PAC/204/Page 2