

April 21, 2017

VIA ELECTRONIC FILING

Public Utility Commission of Oregon
201 High Street SE, Suite 100
Salem, OR 97301-3398

Attn: Filing Center

**RE: Advice No. 16-03—Schedule 215—Irrigation Time-of-Use Pilot Supply
Service—Compliance Report**

The purpose of this filing is to provide a report on the results of the irrigation time-of-use pilot program (Pilot Program) as required by the Commission's approval of PacifiCorp's d/b/a Pacific Power (Company) request in Advice No. 16-03 to extend and expand the pilot.

Background

The purpose of the pilot has been to test the interest, willingness, and ability of irrigators in Oregon to shift their usage away from designated on-peak periods. The pilot was initially designed as a two-year program and first implemented in 2014. Due to low participation in the first year of the program, the Company requested, and the Commission approved, modifications to the rates and an expansion of the pilot to approximately 95 meters in the Klamath Falls area. Higher participation was achieved for the 2015 irrigation season; however, 2015 was a single year of data collected during a drought season. In Advice No. 16-03, the Company requested to extend the Pilot Program for two years and expand the program to additional participants. The Commission accepted Staff's recommendation to allow the extension and a limited expansion and to require a filed report at the end of the 2016 irrigation season containing certain information as described below.

Report Requirements

In response to Staff data requests for Advice No. 16-03, the Company committed to the following:

[T]he Company intends to prepare an estimate of the capacity reduction related to the pilot as well as a more fully developed estimate of potential cost savings (both near-term and long-term) for irrigation time-of-use (TOU) and validate the assumptions in the IRP Class 3 Potential Study. The Company will provide this information to the Commission in a report following the end of the 2016 irrigation season. As part of the report, the Company will also describe its plans for the pilot including how long it proposes to continue the pilot and the potential timing for a permanent tariff.

In addition, Staff's memo requires the Company to investigate the following matters in this report:

- a. The desirability of superimposing critical-peak-pricing onto modified TOU rates;
- b. The appropriateness of creating a separate agricultural TOU class for cost allocation purposes so as to keep the costs and benefits of the TOU within the class;
- c. The overall program benefits implications of making the permanent TOU rates or defined on-peak period less attractive to the pumpers so as to reduce the need for compensatory general rate increases to offset the revenue loss associated with the TOU pumpers' load shifts;
- d. Identification of system benefits that may accrue if the pilot is offered as a full program;
- e. Whether enabling technology might bolster event response and ease of participation.

The Company's responses to these requests along with additional information on pilot results are presented below.

Customer Savings, On-peak usage, and Net Credits

A total of 108 customers participated in the Pilot Program in 2016. Of those participants, 91 saved money in the 2016 season relative to standard irrigation rates. The average savings was 27 percent with 60 percent of participants saving over 30 percent relative to standard rates. Nine participants paid more under the Pilot Program than they would have under standard rates. The average extra payment for these participants was five percent. Two participants paid more than 10 percent over what they would have paid under standard rates; however these two participants were in their second year of the pilot and therefore did not qualify for a guarantee payment for the amount over 10 percent¹. Eight customers participating in the Pilot Program did not irrigate at all during the 2016 season.

Overall, participants used just two percent of their energy during the on-peak period. Compared to the class average of 12 percent on-peak usage, this shows a reduction in on-peak usage or an energy shift to off-peak.

The net credits² provided to participants in 2016 totaled \$110,000.

Estimate of Capacity Reduction related to the Pilot Program

Since the Company does not have profile metering on participants, the Company estimated the reduction in capacity by comparing the demand and the on-/off-peak energy usage as available from the Pilot Program participants' billings to load research profile data from irrigation customers in the Klamath area. To estimate the hourly profile of Schedule 215 participants, the profiles from the Klamath area customers in the irrigation load research study for the on- and off-peak periods were scaled to the energy volumes of on- and off-peak energy for Pilot Program participants. To estimate what participants' hourly loads would have been absent the tariff, the relationship of the sum of the annual maximum individual kW from Klamath area irrigators on the load research study to their hourly profile was scaled to the sum of the annual maximum

¹ The amount over 10 percent was less than five dollars for each of these customers.

² Net credits represent total annual off-peak energy credits net of total annual on-peak energy charges.

individual kW from Schedule 215 participants. The Company estimates that during the Company's July system peak which occurred on July 28, 2016, at hour ending 5pm, 1.4 MW were reduced or roughly 13 kW per participant. Since customer participation in TOU rates does not constitute a firm dispatchable resource, the Company applied its loss of load expectation profile to a flat 13 kW across the on-peak period to estimate a capacity contribution of 35.5 percent.

Estimate of Potential Cost Savings for Irrigation TOU

The Company analyzed the cost impact of the Pilot Program on a per-customer basis. The Company estimates that the Pilot Program has a present value revenue requirement of \$8,535 per incremental customer added in 2017, or \$5,756 per incremental customer added in 2021. Please see the Appendix to this filing for the details of the Company's analysis.

Examination of the Assumptions in the Class 3 Demand-Side Management Potential Study

Based upon the Company's estimate that the Pilot Program saved 1.4 MW during the Company's July peak and that the program has a capacity contribution value of 35.5 percent, the Company estimates that it achieved capacity savings of 0.5 MW from its 108 participants who are primarily in the Klamath basin. In July 2016, there were 1,968 irrigators in Klamath County and 6,157 irrigators in the rest of the Company's Oregon service territory. Assuming that the rest of the Company's service territory could achieve the same level of penetration, the Company estimates that there could be 446 participants which would represent 2.1 MW of capacity reduction. The 2015 IRP Class 3 Potential Study identifies 0.5 MW of potential capacity reduction in Oregon from irrigation TOU rates.

Desirability of Superimposing Critical-Peak Pricing onto irrigation TOU rates

As presented to the Commission by the Company at the August 16, 2016, public meeting, the Company recommends examining advanced pricing programs such as critical peak pricing after the installation of advanced metering infrastructure (AMI) in Oregon, which is scheduled to be completed in 2019. Once AMI is installed and a sufficient period of data collection has passed, the Company will have the data necessary to calculate rates and ultimately evaluate the effectiveness of more complicated pricing structures such as critical-peak pricing.

Appropriateness of a Separate Cost-of-Service Class for Irrigation TOU customers

The Company would be able to consider the appropriateness of creating a separate class for irrigation TOU customers in the cost of service study during the preparation of its next general rate case. However, the irrigation class is already a fairly small class and it is unlikely that a separate class for an optional TOU rate would be appropriate.

Implications of Changes in the TOU Rates Resulting in Reduced Savings to Participants

The TOU rates in the pilot were designed to encourage customer participation through increased potential for savings. The Company already provides an irrigation TOU rate with a lower potential for savings which has a very low participation rate. Based on participation levels in the existing irrigation TOU schedule, it seems likely that if the pilot were to be converted to a permanent program with a lower potential for savings, customers would be less likely to participate.

Potential System Benefits for Offering Pilot as a Full Program

The potential system benefit of offering the pilot as a full program would be to decrease the Company's peak capacity. The potential for decreasing the Company's peak capacity is discussed above.

Potential for Enabling Technology

In participant surveys conducted in 2014 and 2015, many participants indicated that they had invested in enabling technology which seemed to assist in avoiding on-peak pumping. If the irrigation TOU pilot is converted into a permanent rate, the Company would encourage participants to examine whether enabling technology is right for them.

Conclusion/ Discussion

An evaluation of pilot participants' loads indicates that they were able to shift a significant level of load away from the summer on-peak period. However, since the Company does not have profile metering installed on participants' meters, its extrapolation from monthly on-/off-peak usage to the profile from load research customers in the Klamath Basin area is uncertain and anecdotal at this time. The Company's financial analysis indicates that significant benefits may be possible from a fully expanded irrigation time-of-use offering, but the reduction in revenue related to Schedule 215's present rate design outweighs those benefits.

When AMI is fully deployed, the Company will have greater insight into the actual loads of these customers. At that time, the Company will also have the ability to remotely re-program meters to both change the time periods of the on-/off-peak periods for existing participants and to enroll new participants without incremental expense. Because the Company estimates that the reduction in revenue outweighs the benefits of the tariff under present conditions and under the present rate design, the Company recommends that the tariff not be expanded to additional participants at this time. In light of the potential benefits, the Company does not, however, recommend terminating this tariff offering. The Company has been able to glean some useful information from the pilot and has also established a core group of experienced participants. With the impending deployment of AMI, the Company foresees the flexibility to revisit its key assumptions and explore, through this tariff, other potential rate designs which could form the basis for a permanent tariff.

It is respectfully requested that all formal data requests regarding this matter be addressed to:

By E-Mail (preferred): datarequest@pacificorp.com

By regular mail: Data Request Response Center
PacifiCorp
825 NE Multnomah, Suite 2000
Portland, Oregon, 97232

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Informal questions may be directed to Natasha Siores at (503) 813-6583.

Sincerely,

A handwritten signature in black ink, appearing to read "R. Bryce Dalley", with a long horizontal flourish extending to the right.

R. Bryce Dalley
Vice President, Regulation
Enclosures

APPENDIX

Irrigation Time-of-Use Rate Pilot Financial Analysis Report



Irrigation Time-of-Use Rate Pilot Financial Analysis Report

Background

The time-of-use rate pilot program for irrigation customers in and around Klamath Falls and Albany, Oregon is closed to new service. The Company prepared a financial analysis on incremental costs and benefits of adding new customers to the pilot program.

Irrigation Time-of-Use Rate

Oregon Schedule 215 Irrigation Time-of-use Pilot Supply Service offers customers an incentive to shift consumption from on-peak hours to off-peak hours. Billing under Schedule 215 is in addition to the customer's billing under schedule 41 agricultural pumping service and the customer's supply service schedule. Customers pay a surcharge of 22.313¢/kWh during on-peak hours and receive a credit of 3.161¢/kWh during off-peak hours. Schedule 215 is effective during the prime summer season defined as June 1 through August 31. On-peak hours are defined as 2:00 p.m. to 6:00 p.m. Monday through Friday excluding Independence Day. All other hours are off-peak.

The financial review of the program is based on adding one customer to the program.

Program Costs (2017 dollars)

Metering Costs - \$286 per customer based on 10% of customers requiring a new meter at \$520 and 90% of customers requiring reprogramming of the existing meter at \$260. After advanced metering infrastructure (AMI) is deployed, it is assumed that there would be no incremental metering costs.

Marketing Costs - \$46 per customer.

Lost Revenue - \$1,007 per customer.

Program Benefits (2017 dollars)

Short-Term Energy Arbitrage – The short-term energy arbitrage is based on: 1) 3,800 kWh annually per meter and 2) the average price spread between heavy- and light-load hours for June, July, and August. Prices are based off the December 31, 2016, official forward price curve for Mid-C. The arbitrage continues through the capacity sufficiency period ending in 2027. Thereafter, this value is captured in the generation deferral value.

Generation Deferral Value - Reflects the partial displacement differential revenue requirement avoided cost methodology employed for Qualifying Facility pricing in Oregon. The value of capacity is zero through the capacity sufficiency period ending in 2027. Starting in 2028, the value of capacity is based on the costs of a combined cycle combustion turbine identified in the Company's 2015 IRP Update. Please see attachment 1.

The 2028 generation deferral value is \$764 per meter and is the product of:

- 1) The generation deferral value of \$149.06 per kW,
- 2) The program's estimated capacity contribution of 35.5%,
- 3) Program capacity of 13 kW per meter, and
- 4) Loss factor of 1.11057.

Transmission Deferral Value – The transmission deferral value of \$5.94 per kW in 2017 dollars is based on 2016 through 2021 budgeted transmission additions of \$219 million, which would add 2,375 MVA of capacity. This is the value to the Company of deferring one kW of load one year and is applied all years beginning in 2017. This value is adjusted for inflation annually.

For example, the 2028 transmission deferral value is \$111 per meter and is the product of:

- 1) The transmission deferral value of \$5.94 per kW,
- 2) Inflation adjustment of 1.291,
- 3) Program capacity of 13 kW per meter, and
- 4) Loss factor of 1.11057.

Distribution Deferral Value – The distribution deferral value of \$6.40 per kW in 2017 dollars is the product of: 1) 2016 through 2021 budgeted distribution additions of \$28.5 million which would add 147.5 MVA of capacity, and 2) a 47.59% utilization factor. This is the value to the Company of deferring one kW of load one year and is applied all years beginning in 2017. This value is adjusted for inflation annually.

For example, the 2028 distribution deferral value is \$114 per meter and is the product of:

- 1) The distribution deferral value of \$6.40 per kW,
 - 2) Inflation adjustment of 1.291,
 - 3) Program capacity of 13 kW per meter, and
 - 4) Loss factor of 1.06520.
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Other Assumptions

- 20-year program life.
- Discount rate of 6.59%.
- Oregon property tax rate of 1.17%.
- Income tax rate of 37.951%.
- The revenue requirement is based on a capital structure of 48.6% debt and 51.4% common with a 5.26% interest rate and a 9.74% return on equity.

Conclusion & Recommendation

The time-of-use rate pilot program for irrigation customers in and around Klamath Falls and Albany, Oregon is closed to new service. The Company has prepared an analysis on adding additional customers to the pilot.

Adding customers to the Oregon schedule 215 Irrigation Time-of-Use Pilot Supply Service would have a present value revenue requirement cost to Oregon customers of \$8,535 per customer added in 2017 or \$5,756 per customer added in 2021. Detailed results are summarized below:

PacifiCorp
Oregon Schedule 215 Irrigation Time-of-Use Pilot Supply Service
Present Value Revenue Requirement Cost / (Benefit) per New Customer

Year Customer Added	2017	2021
Program Costs		
Metering Costs		
Reprogram Meters (TOU)	227	-
TOU Meters	63	-
Marketing	45	38
Time-of-Use Rate	13,675	11,628
Total Program Costs	14,009	11,666
Program Benefits		
Short-Term Arbitrage (Mid-C June-Aug.)	(311)	(156)
Generation Deferral Value	(2,803)	(3,750)
Transmission Deferral Value	(1,161)	(985)
Distribution Deferral Value	(1,199)	(1,018)
Total Program Benefits	(5,474)	(5,910)
Present Value Revenue Requirement Cost / (Benefit)	8,535	5,756

Exhibit 1
Standard Avoided Cost Prices for Base Load QF (1)
\$/MWh

Year	Standard Avoided Resource		Base Load QF Resource				
	Avoided Firm Capacity Costs	Energy Only Price	Capacity Contribution	QF Capacity Adder	Capacity Adder Allocated to On-Peak Hours	On-Peak	Off-Peak
	\$/kW-yr	\$/MWh		(\$/kW-yr)	(\$/MWh)	\$/MWh	\$/MWh
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
				= (a) *(c)	(d) *1000 / (100.0% x 8760 x 56%)	(e) +(b)	= (b)
2016						\$23.43	\$19.86
2017						\$26.30	\$21.68
2018						\$28.22	\$22.97
2019						\$29.44	\$23.80
2020						\$30.99	\$25.14
2021						\$33.03	\$27.14
2022						\$35.96	\$30.03
2023						\$40.26	\$33.69
2024						\$44.43	\$37.30
2025						\$46.61	\$39.32
2026						\$48.41	\$40.90
2027						\$50.57	\$42.74
2028	\$149.06	\$32.45	100.0%	149.06	\$30.36	\$62.82	\$32.45
2029	\$152.18	\$33.37	100.0%	152.18	\$31.00	\$64.37	\$33.37
2030	\$155.56	\$35.46	100.0%	155.56	\$31.69	\$67.14	\$35.46
2031	\$158.99	\$36.37	100.0%	158.99	\$32.39	\$68.76	\$36.37
2032	\$162.49	\$37.35	100.0%	162.49	\$33.10	\$70.45	\$37.35
2033	\$166.05	\$38.59	100.0%	166.05	\$33.82	\$72.42	\$38.59
2034	\$169.68	\$39.77	100.0%	169.68	\$34.56	\$74.33	\$39.77
2035	\$173.39	\$40.88	100.0%	173.39	\$35.32	\$76.20	\$40.88

(1) Capacity Contribution of the Avoided Proxy and Base Load QF resources are assumed to be 100%.

Columns

- (a) Full fixed cost of a proxy CCCT less capitalized energy
- (b) Fuel and Capitalized Energy Cost of the Proxy CCCT
- (c) 100.0% is the on-peak capacity factor of the Base Load QF resource
56% is the percent of all hours that are on-peak
- (f) 2016-2027 On-Peak Blended Market Prices for QF resource
- (g) 2016-2027 Off-Peak Blended Market Prices for QF resource