ITEM NO. 1

PUBLIC UTILITY COMMISSION OF OREGON
STAFF REPORT
PUBLIC MEETING DATE: November 13, 2015

REGULAR X **CONSENT** ____ **EFFECTIVE DATE** N/A

DATE: November 6, 2015

TO: Public Utility Commission

FROM: Michael Breish MB

THROUGH: Jason Eisdorfer and Aster Adams

SUBJECT: PACIFICORP: (Docket No. UM 1667) 2015 Annual Smart Grid Report.

STAFF RECOMMENDATION:

Staff recommends the Commission accept PacifiCorp's (Company) *2015 Smart Grid Report* as having met the requirements of Order No. 12-158 established in Docket No. 1460. Staff also requests the Commission accept Staff recommendations described below for future PacifiCorp smart grid reports.

DISCUSSION:

Applicable Law

In 2012, the Commission issued Order No. 12-158, establishing smart grid policy goals and objectives, utility reporting requirements, and Commission guidelines for utility actions related to smart grid. Under Order No. 12-158, utilities were required to file an initial smart grid report that, at a minimum, included the following main elements:

1. Smart grid strategy, goals, and objectives.

2. Status of smart grid projects, initiatives, and activities that are underway, results of implemented smart grid projects, and planned smart grid investments for the next five years.

3. Smart grid opportunities the company is considering for the next five years and any constraints.

4. Targeted evaluations pursuant to Commission-approved stakeholder recommendations.

5. Related activities.

Thereafter, utilities were required to file an annual smart grid report that, at a minimum, includes incremental additions and updates of all elements of the initial report.[1] On an on-going basis, the Commission provides for comment by Staff and parties including recommendations on smart-grid investments and applications to be explored by the utilities. If the Commission approves any of these recommendations, "the Commission may require the utilities to address the recommendations in a subsequent report."[2]

The Commission accepted PacifiCorp's second *Smart Grid Report* (2014 Report) as having met the requirements of Order No. 12-158.[3] At the same time, in its order accepting the 2014 Report, Order No. 15-050, the Commission adopted the list of Staff recommendations for PacifiCorp's *2015 Smart Grid Report.*[4] The recommendations adopted by the Commission were as follows:

1. Conduct at least one stakeholder workshop to review the results of the Oregon Advanced Metering Project [Request for Proposals] RFP, and to discuss the Company's criteria for moving forward, with a focus on the benefit assumptions.

2. Include an update on the Company's use of the two applications of [dynamic line rating] DLR technology described in the 2014 Report, and on any additional applications of DLR technology evaluated.

3. Report on its progress in obtaining and operationalizing the use of synchrophasor data, specifically identifying remaining obstacles to gaining access to the full range of [phasor measurement unit] PMU data on the transmission system.

4. Proposal for a pilot or project that will demonstrate the use of [direct load control] DLC, storage technology, and/or smart inverters in supporting the management of variable distributed resources.

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[1] Commission Order No. 12-158, page 4, Docket No. UM 1460, May 8, 2012.
[2] Ibid.
[3] Commission Order No. 15-050, Docket No. UM 1667, February 20, 2015.
[4] Ibid., Appendix A, pages 12-13.

Staff's standard of review

The standard of review utilized by Staff in its review of the utilities' smart grid reports subsequent to their initial reports is set forth below. Staff employed this same standard in reviewing the Company's *2015 Smart Grid Report:*

1. Whether the Company met the guidelines set forth by the Commission in Order No. 12-158;[5] and

2. Whether the Company addressed prior Commission-approved recommendations from prior smart grid report reviews regarding potential smart grid investments and applications.

Staff concludes that PacifiCorp complied with the guidelines set forth in Order No. 12-158 and with the Commission's recommendations from Order No. 15-050.[6] PacifiCorp's report and reply comments are consistent with the Commission's reporting requirements outlined in Order No. 12-158. Nevertheless, Staff notes a few areas where reporting expectations for future reports are clarified.

Analysis

Overview

On June 12, 2015, prior to filing its report, PacifiCorp held a smart grid workshop to receive and consider feedback from stakeholders on its *2015 Smart Grid Draft Report.* PacifiCorp submitted its third smart grid report on August 3, 2015, per Commission requirements found in Order No. 12-158.[7] Staff offered informal comments to aid in the development of the report.

Upon publication of the report, interested parties were asked to file written comments on PacifiCorp's *2015 Smart Grid Report* by September 18, 2015. The Citizens' Utility Board (CUB) and Oregon Department of Energy (ODOE) filed written comments. In its reply comments filed on October 16, 2015, PacifiCorp addressed Staff's and the two interveners' comments.

Both CUB and Staff noted in their respective comments that they found the report largely unchanged from the 2014 Report. CUB noted, and Staff agrees, that to a certain

[5] This should also include incremental additions and updates of all elements of the first report. *See* Order No. 12-158 at 4.
[6] Ibid.
[7] Commission Order No. 12-158, at page 4, Docket No. UM 1460, May 8, 2012.

extent, a utility's smart grid report does not necessarily have to change from year to year. However, the descriptions of many of the topics were essentially repeated or lacking incremental updates. The table in which PacifiCorp highlights individual responses to Staff's informal comments is helpful in that it further validates Staff's finding that some of the informal comments were not addressed to the fullest extent possible.

PacifiCorp's reply comments validate Staff's and CUB's concerns regarding the effort in updating the report. Staff found these reply comments to be robust and quite informative; the specificity and depth of the updates reflect some of the most helpful and detailed smart grid information Staff has seen so far in the Commission's smart grid process. Staff appreciates the time and effort PacifiCorp spent responding to stakeholder comments. Yet, some of the more detailed information should have been initially found in the main text of the report, especially if it were available to the Company at the time of production of the *2015 Smart Grid Report.* Furthermore, the reporting guidelines presented in Order No. 12-158 require the Company to include incremental updates to ongoing or planned smart grid efforts in the report itself.

Staff believes that "PacifiCorp's failure to respond to Staff's informal comments is detrimental to the smart grid process." Staff finds the fact that PacifiCorp ultimately complies with the reporting requirements and the expectations of stakeholders by means of its reply comments, and not by the report alone, to be disconcerting.

PacifiCorp's response to recommendations adopted in Order No. 15-050

Staff addresses each of the requirements from Order No. 15-050, the order which addressed PacifiCorp's 2014 Report. Staff includes pertinent intervener comments where applicable as well as any recommendations.

Requirement #1: PacifiCorp conduct at least one workshop to review the results of the Oregon Advanced Metering Project RFP and to discuss the Company's criteria for moving forward, with a focus on the benefit assumptions.

Prior to the smart grid workshop held to discuss the *2015 Smart Grid* Draft *Report* that occurred in the afternoon of June 12, 2015, PacifiCorp also held a confidential workshop that morning to present and discuss the results of the Company's analysis of the "advanced metering infrastructure" (AMI) RFP issued in September 2014. Staff was the only stakeholder present for this morning meeting. After reviewing the RFP process and project analysis, PacifiCorp stated that, though a marginal positive business case does exist, the Company believes proceeding to install AMI across its entire Oregon

service territory is premature at this time. The Company's position presented at this workshop reflected the associated analysis in the Company's *2015 Smart Grid Report.*[8]

Upgrades to the Company's customer information system and other "information technology" (IT) applications are necessary to achieve the full suite of benefits from AMI, such as "dynamic pricing, demand response programs and outage management."[9] To determine the financial and company-resource impacts of the full AMI business plan installation, PacifiCorp identified the specific order of implementation that would maximize benefits to customers as well as mitigate impacts to utility service. PacifiCorp confirmed from this evaluation that key IT upgrades should be completed before an AMI system is installed across the Company's Oregon service territory.

Staff comments: Staff reiterated in its formal comments its previous concerns regarding the seemingly limited scope of benefits the Company included in its AMI analysis. In its presentation to Staff, PacifiCorp quantified AMI benefits to the Company and parts of the system, such as outage detection and voltage monitoring, but did not quantify benefits that flow to ratepayers, such as reduced energy charges or outage time through demand response and reliability improvements. Staff recognized the chosen boundaries of PacifiCorp's analysis and the Company's preference for an AMI deployment that immediately utilizes all available functions and benefits, but expressed a need for greater transparency into the methodologies.[10]

PacifiCorp response: The Company will continue to keep the Commission apprised of new developments related to AMI deployment as it continues to evaluate AMI's benefits in tandem with the Company's ongoing process to update its IT and customer systems.

Staff recommendation: PacifiCorp should continue to provide updates to the Commission regarding AMI evaluation as it pertains to the Company's Oregon service territory, including status updates of necessary IT and customer systems.

Requirement #2: Include an update on the Company's use of the two applications of DLR technology described in the 2014 Report, and on any additional applications of DLR technology evaluated.

PacifiCorp provided updates regarding the two uses of DLR technology described in its 2014 Report. Two transmission lines have been equipped with DLR technology: the Platt line project was completed in 2013, and with incremental updates in 2014, the path

[8] PacifiCorp's *2015 Smart Grid Report,* at pages 21-22, Docket No. UM 1667, August 3, 2015.
[9] Ibid.
[10] PacifiCorp chose not to include certain benefits in the Company's calculations due to the necessary IT infrastructure upgrades.

rating increased from 810 MW to 1025 MW; the West-of-Populus path is still collecting data and is expected to be completed in time for the *2016 Smart Grid Report* barring data quality issues. PacifiCorp was able to use LiDAR surveys to remediate clearance issues, which is the second application of DLR. Additionally, PacifiCorp "is currently exploring incorporation of the DLR data into the Jim Bridger Remedial Action Scheme (RAS) to limit arming conditions and generation exposure to tripping from the RAS."[11]

Staff comments: Staff acknowledges that PacifiCorp has provided sufficient information and has complied with this requirement.

CUB comments: In its 2014 Report, PacifiCorp stated the West-of-Populus DLR line project would be completed by the *2015 Smart Grid Report.* However, the line's completion was pushed to the *2016 Smart Grid Report* in the Company's *2015 Smart Grid Report* with no explanation for the postponement. CUB stated that "there should be at least an explanation as to the Company's rationale for not providing details about the project's postponement."[12]

PacifiCorp response: PacifiCorp clarified and updated the current status of the two paths currently being tested with DLR. Because the West-of-Populus line's loading has yet to approach the thermal capacity of the line during the calibration period, data observations are inconclusive.[13] In addition to the updates regarding the two lines, PacifiCorp discussed the use of a related technology to DLR called thermal replicating relays, which trip the line to open when the devices sense line thermal limits have been exceeded. PacifiCorp is currently exploring the use of this particular technology in its Soda Springs area of Idaho, where a path's particular circumstances warrant the use of this technology over more expensive RAS.

In an expanded response to Staff's query regarding the use of DLR in the Company's integrated resource plan (IRP) process, PacifiCorp explained that transmission planning engineers have not recommended additional DLR studies and they continue to evaluate DLR as a transmission alternative using "transmission planning's engineering judgment."[14]

Staff recommendation: PacifiCorp should continue as planned to report on West-of-Populus's possible results in the Company's *2016 Smart Grid Report,* and if no update is available, provide a full explanation as to why that is the case. Additionally, provide an update regarding the Company's use of thermal replicating relays at the Soda Springs

[11] Ibid., page 11.
[12] CUB's 2015 Comments, at page 2, Docket No. UM 1667, September 18, 2015.
[13] PacifiCorp's 2015 Reply Comments, at page 15, Docket No. UM 1667, October 16, 2015.
[14] Ibid.

area and any other location the Company may determine in the interim. Finally, Staff would like to see the ensuing 2017 IRP analysis of specific transmission lines that PacifiCorp considers DLR as an alternative to traditional infrastructure upgrades.

Requirement #3: Report on its progress in obtaining and operationalizing the use of synchrophasor data, specifically identifying remaining obstacles to gaining access to the full range of PMU data on the transmission system.

As the Western Electricity Coordinating Council (WECC) and Peak Reliability continue to develop data access for utility participants by means of the "wide area view" tool, PacifiCorp will continue to work with Peak Reliability to determine how to use the PMU data in situational awareness applications. PacifiCorp is evaluating the use of PMU technology for "benchmarking, validation, and fine tuning of system planning models," which the *2016 Smart Grid Report* will contain an update on.[15]

Staff comments: Staff asked for any additional granularity regarding synchrophasors and efforts surround benchmarking, validation, and fine tuning that PacifiCorp indicates will be discussed in the *2016 Smart Grid Report.*

CUB comments: With at least two years of data available to the Company, CUB expects PacifiCorp would be able to provide more substance in its update on synchrophasor use beyond a restatement of 2014 Report description on the topic.[16]

PacifiCorp response: PacifiCorp continues to pursue gaining access to PMU data for transmission system planners to benchmark, validate, and fine tune system planning.[17] By 2017, PacifiCorp must meet a North American Electric Reliability Corporation standard that addresses transmission system model validation; "PacifiCorp is actively investigating the use of PMU data to validate models and subsequently satisfy this requirement."[18] PacifiCorp states that more information on obtaining PMU data for model validation will be presented in the *2016 Smart Grid Report.*

Staff recommendation: PacifiCorp continue to report on any working relationship developments with WECC and Peak Reliability as well as providing comprehensive qualitative and quantitative analysis regarding the utilization of PMU data for transmission system model validation that the Company plans to detail in the *2016 Smart Grid Report.*

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[15] PacifiCorp's *2015 Smart Grid Report,* at page 14, Docket No. UM 1667, August 3, 2015.
[16] PacifiCorp began transmitting data to WECC in 2013. *See* PacifiCorp's *2015 Smart Grid Report,* at page 12, Docket No. UM 1667, August 3, 2015.
[17] PacifiCorp's Reply Comments, at page 18, Docket No. UM 1667, October 16, 2015.
[18] Ibid.

Requirement #4: Proposal for a pilot or project that will demonstrate the use of DLC, storage technology, and/or smart inverters in supporting the management of variable distributed resources.

PacifiCorp currently offers an irrigation DLC program, operated by EnerNOC, to the Company's Rocky Mountain Power Utah and Idaho service territories. PacifiCorp provides a day-ahead notice to EnerNOC, who then manages dispatch and calculates load reductions. Because PacifiCorp's preferred portfolio in the Company's 2015 IRP selected irrigation load management in Oregon in 2022, the Company is currently evaluating the feasibility of offering a pilot program modeled on its existing EnerNOC schedule to determine feasibility. The pilot would operate from 2016-2020.

Staff remarks that, absent a robust AMI deployment in the Company's Oregon service territory, a DLC program that is dynamic enough to accommodate variable distributed resources is difficult to accomplish. However, the potential to conduct DLC exists with the interval equipment that EnerNOC provides participating irrigation customers. Staff is of the opinion that transitioning customers from voluntary to third-party direct controlled dispatch is facilitated by customer familiarity with the program operations and transparent benefits. Doing so enables a sustainable and enduring program.

Storage technology and smart inverters are discussed later in this memo.

Staff recommendation: PacifiCorp should provide the results of the feasibility assessment for the irrigation load control pilot under consideration for Oregon, including methodologies and both qualitative and quantitative components of the analysis.

Additional Comments

Centralized Energy Storage (CES)/ Non-Wire Alternatives

Staff comments: Referencing discussions with the Company at the meeting on June 12, 2015, Staff requested additional specificity of three specific CES, non-wire alternative efforts.[19]

ODOE comments: ODOE "encourages the Commission to direct the Company to conduct a more comprehensive, integrated evaluation of energy storage, which includes

[19] PacifiCorp's *2015 Smart Grid Report,* at page 16, Docket No. UM 1667, August 3, 2015.

assessing more than one potential system benefit from an energy storage system investment."[20]

PacifiCorp response: In addressing ODOE's comments, PacifiCorp referred to its application in response to ODOE #15-013, which includes potential benefits such as mitigation of transient over/under voltage and grid frequency excursions, and distribution feeder voltage support.[21] PacifiCorp also highlights a circuit in Redmond, Oregon where centralized energy storage could potentially offset the need for traditional capital investment as well as the development of a tool to facilitate transmission engineers' evaluation of CES as an alternative to transformer replacement. PacifiCorp plans to provide a summary of both efforts in the Company's *2016 Smart Grid Report.*

To address Staff's comments, the Company details one of three listed CES projects, the one conducted in PacifiCorp's service territory.[22] In this project, a distributed energy resource (DER) stand-alone proved to be cost ineffective, more risky, and unviable due to the DER's intermittency. With a CES component, the DER alternative became feasible, but remained cost ineffective. The study concluded "that DER alternatives, in particular energy storage, can be a legitimate alternative to traditional solutions given the traditional solution is expensive or difficult to build/permit."[23]

Staff Recommendation: PacifiCorp should include a comprehensive and exhaustive evaluation of each candidate circuit discussed in the Company's reply comments, including methodologies, assumptions, and sources that identify all potential benefits and costs of CES as appendices in its *2016 Smart Grid Report.*

Distribution Automation (DA)/Management

Staff comments: Staff reiterated its recommendation made in its 2014 Staff Report in its 2015 comments:

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[20] Oregon Department of Energy's Comments on PacifiCorp's 2015 Smart Grid Report, at pages 1-2, Docket No. UM 1667, September 18, 2015.
[21] Application #15-013 is the Company's joint application with Oregon State University in response to House Bill 2193. PacifiCorp's Reply Comments, at page 19, Docket No. UM 1667, October 16, 2015.
[22] Studies were held at PacifiCorp, NV Energy, and MidAmerican; none were intended as full non-wire alternatives, but the PacifiCorp study included a transformer overload application. PacifiCorp notes that the study conducted in NV Energy's service territory proved to be more cost effective than a traditional upgrade. Due to permitting issues, the CES alternative was not pursued.
[23] *See* footnote 23, above.

> "suggest that PacifiCorp conduct a study of its distribution automation potential including a cost-benefit analysis and based on cost and distribution system assumptions that will enhance reliability and yield benefits to customers."[24]

Staff is concerned that the Company's current evaluation approach, where either all potential compatible transmission and distribution devices are upgraded with DA technology or nothing is done, is denying PacifiCorp customers benefits whereas if DA technology were implemented incrementally such that outage-prone areas are addressed first, and ultimately better served, then improved cost/benefit ratios would be produced. Staff asked PacifiCorp to consider the feasibility of the study recommended originally in its 2014 Staff Report.

PacifiCorp response: PacifiCorp describes the process in which such a DA study would need to be conducted in order to generate constructive results, including establishing criteria for which locations qualify and the requirements for integrating with PacifiCorp's existing communicating infrastructure. Though PacifiCorp includes devices with DA functionality in its existing evaluations, criteria such as existing communication infrastructure limit these devices' deployment. In order to maximize the benefits of DA technology, PacifiCorp states that "a communication backbone should be available to provide improved situational awareness to an outage management system or distribution management system."[25] Because of this, PacifiCorp prefers to select devices "that are capable of integration with any future deployment of a distribution management system."[26]

PacifiCorp then describes an example of how a specific DA technology, a Fuse Saving device, is being evaluated under its current scoping process for reliability improvement projects in Washington, California, and Oregon. These devices may be able to utilize the existing communicating faulted circuit indicators communications architecture. PacifiCorp is evaluating the feasibility and cost of establishing communications with these devices and will provide an update in the *2016 Smart Grid Report.*

Staff Recommendation: PacifiCorp should include the update on the feasibility of Fuse Saving device implementation with the accompanying methodology and qualitative and quantitative data in the Company's *2016 Smart Grid Report.* PacifiCorp should also include a status update, including any benefits, of the implementation of capacitor bank, recloser, and regulator bank controls.

Communicating Faulted Circuit Indicators (CFCI)

[24] Commission Order No. 15-050. Appendix A, at page 8, Docket No. UM 1667, February 20, 2015.
[25] PacifiCorp's Reply Comments, at pages 22-23, Docket No. UM 1667, October 16, 2015.
[26] Ibid., at page 23.

Staff comments: Staff requested PacifiCorp explain the reasons for the delay in anticipated information regarding CFCI, and if results are pending, if any preliminary results and/or conclusions can be provided at this time.

CUB comments: PacifiCorp stated in its 2014 Report that a cost-benefit analysis on the CFCI would appear in the Company's *2015 Smart Grid Report.* CUB expressed disappointment that the Company did not include any analysis or provide reasons to why such an analysis was not provided.

PacifiCorp response: Because CFCIs could not fully be integrated into the Company's "outage management system" (OMS) due to the incompletion of a "secure network architecture that permits the joining of cellular-based sensors with PacifiCorp's ...OMS," the benefits of CFCIs could not be quantified. This circumstance delayed the cost-benefit analysis.[27] PacifiCorp further explains that a vendor will release new firmware to facilitate the integration of communications from CFCIs with PacifiCorp's OMS applications. However, "a preliminary analysis of sensor alerts and loading data since deployment has validated the technologies functionality and measurement capabilities."[28]

Staff Recommendation: PacifiCorp should provide a summary of ongoing efforts of completing a cost-benefit analysis of CFCIs, including alternative communication technologies such as AMI, in case the cost-benefit analysis is not ready for the *2016 Smart Grid Report.*

Conservation Voltage Reduction (CVR)

Throughout 2015, the Company is transitioning to a new, more powerful circuit analysis application called Cyme, which will be the principal distribution system modeling tool used by PacifiCorp distribution engineers.

CUB comments: CUB seeks additional detail on newer circuit analysis application, Cyme, which PacifiCorp has recently started using.

PacifiCorp response: PacifiCorp provides a summarizing list of the nuanced technical features of Cyme as well as a link to the developer's literature on the program and its respective applications. PacifiCorp clarifies that Cyme "will benefit Oregon customers by

[27] PacifiCorp's 2015 Reply Comments, at pages 24-25, Docket No. UM 1667, October 16, 2015.
[28] Ibid., 24.

improving the management of the progressive network, including a more robust DER impact and resolution analysis."[29]

Staff Recommendation: PacifiCorp should provide an update, including milestones, of its planned transition to a new, more powerful circuit analysis application. PacifiCorp should also provide an evaluation of the expected impact of the new circuit analysis on the potential for CVR application.

Customer Outreach regarding time-of-use (TOU) program

Staff comments: Staff requested PacifiCorp present its explanation for the continued low participation of customers in TOU programs offered in Oregon.

PacifiCorp response: PacifiCorp conducted additional customer outreach in order to address an under-performing 2014 irrigation TOU pilot program. The feedback received regarding customer behavior enabled the Company to modify the program to better meet customer needs. Modifications included "a greater on-to-off-peak rate ratio for increased potential savings, expanded the opportunity to participate in the pilot to all of the approximately 95 meters that signed up in 2015, and increased the maximum pilot participation cap."[30] PacifiCorp reports these modifications have yielded greater participation rates in this particular irrigation TOU program.

Staff Recommendation: PacifiCorp should describe in its *2016 Smart Grid Report* how lessons learned from the irrigation TOU program can be applied to the other TOU programs offered by the Company.

Demand Response Programs

Staff comments: Staff inquired about the potential to implement a behavioral demand response (BDR) pilot in order to not only determine potential load drops, but to also familiarize and educate customers about their potential role in demand-side management programs.

CUB comments: CUB requested information that was promised in the *2015 Smart Grid Report,* but was not ultimately provided, regarding upgrades to the Company's Cool Keeper direct load control program.

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[29] Ibid., 25.
[30] PacifiCorp's *2015 Smart Grid Report,* at page 26, Docket No. UM 1667, August 3, 2015.

ODOE comments: ODOE requests PacifiCorp to implement a demand response pilot that tests a load with year-round availability for both peaking and regulation services on either the west side of Oregon or the Klamath Basin.

PacifiCorp response: In response to Staff's comments, PacifiCorp states that, absent AMI, implementing a BDR pilot is not feasible. To do so regardless of AMI would require additional investments necessary to capture customer usage data that would make justification of a pilot difficult.

In response to CUB's comments, PacifiCorp describes the benefits of the efficiency improvements, including operational improvements that enable the Company to better forecast the anticipated load reduction due to device communication and verification, and local weather modeling. Efficiency improvements also greatly enhance measurement and verification analysis capabilities, including better profiling of customer class air conditioning load profiles and increased data resolution that enables the Company to address specific program questions.
In response to ODOE's comments, the Company points to the irrigation load control pilot that is currently under evaluation. PacifiCorp states that few demand response programs exist that are available in all seasons; a commercial curtailment product was modeled in the Company's 2015 IRP, but was not selected in the preferred portfolio. Because commercial curtailment does not differ in cost and feasibility that much from the irrigation pilot being considered, the Company does not believe pursuit of an all-season demand response program is warranted at this time.

Staff Recommendation: PacifiCorp should provide a quantitative and qualitative comparison of the Cool Keeper program's performance before and after the efficiency improvements in the *2016 Smart Grid Report*.

Smart Inverter Interconnection Evaluation upon Operational Issue due to DER

ODOE comments: ODOE first describes the existing disconnect between current, advanced smart inverters and the dated interconnection process that utilities utilize in evaluating new distributed resources.[31] ODOE then encourages the Commission "to direct the Company to evaluate smart inverters in the interconnection of distributed resources whenever the system impact studies show that the distributed resource does result in an operational problem."[32]

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[31] The current rule for interconnection of renewable energy projects 10MW and smaller is based on IEEE 1547, which was published in 2003. ODOE's Comments on PacifiCorp's *2015 Smart Grid Report,* at page 2, Docket No. UM 1667, September 18, 2015.
[32] ODOE's Comments on PacifiCorp's *2015 Smart Grid Report,* at page 3, Docket No. UM 1667, September 18, 2015

PacifiCorp response: Smart inverter manufacturers are still developing and certifying the technology, but PacifiCorp remains abreast of developments and participates as a member of the IEEE 1547 standard committee. PacifiCorp adds that the Company is currently evaluating ways of assessing DER impacts on operations by "modeling circuits and developing standards" by collaborating with other utilities owned by Berkshire Hathaway. The goal is to move towards a progressive network. The collaboration has already selected two circuits in Oregon to evaluate different levels of DER penetration, and upon completion of the study, PacifiCorp will present findings that may indicate better ways of managing two-way power flow in the Company's *2016 Smart Grid Report.*
Staff Recommendation: PacifiCorp should provide a comprehensive analysis, including methodologies, and qualitative and quantitative data of possible benefits and costs, of the Company's collaborative analysis of DER integration.

Reliability Metrics Reporting

Staff comments: To encourage increased transparent, quantitative evaluations of impacts on operations and reliability due to smart grid investments, Staff is requesting all three Investor Owned Utilities (IOUs) begin including reliability metrics as a feature of the IOUs' annual smart grid reports.

PacifiCorp response: PacifiCorp points to its existing Service Quality Measures annual filing that includes metrics such as SAIDI, SAIFI, CAIDI, and MAIFI. PacifiCorp states the Company is interested in working with Staff to determine which reliability metrics should be included in future smart grid reports.

Staff Recommendation: Staff will review IOUs' annual Service Quality Measures filings to determine the best way to integrate the data to annual smart grid filings.

Inclusion of Evaluation of Smart Inverters in Company Interconnection Policy Update

ODOE comments: ODOE asserts that benefits can occur for both PacifiCorp and a resource seeking an interconnection request if PacifiCorp includes smart inverters as one of the options to address adverse impacts resulting from a system impact study.

PacifiCorp response: PacifiCorp will update the Company's interconnection policy to include smart inverter standards upon the corresponding update of the corresponding IEEE standard.

Staff Recommendation: Staff concurs with PacifiCorp that only after an update of the IEEE 1547 standard should the Company then update its internal interconnection policy.

Recommendations:

Staff recommends the Commission accept PacifiCorp's *2015 Smart Grid Report* and acknowledge that it meets the requirements of Order No. 12-158. Staff also recommends that the Company take or implement the following actions:

1. Include a high-level table summary of all stakeholder informal comments and corresponding Company responses as an appendix in future smart grid reports.

2. Continue to provide updates to the Commission regarding AMI evaluation as it pertains to the Company's Oregon service territory, including status updates of necessary IT and customer systems.

3. Continue as planned to report on West-of-Populus's possible results in the Company's *2016 Smart Grid Report,* and if no update is available, provide a full explanation as to why that is the case.

4. Provide an update regarding the Company's use of thermal replicating relays at the Soda Springs area and any other location the Company may determine in the interim in the *2016 Smart Grid Report.*

5. Provide the ensuing 2017 IRP analysis of specific transmission lines that PacifiCorp considers DLR as an alternative to traditional infrastructure upgrades.

6. Continue to report on any working relationship developments with WECC and Peak Reliability as well as providing comprehensive qualitative and quantitative analysis regarding the utilization of PMU data for transmission system model validation that the Company plans to detail in the *2016 Smart Grid Report.*

7. Provide the results of the feasibility assessment for the irrigation load control pilot under consideration for Oregon, including methodologies and both qualitative and quantitative components of the analysis.

8. Include a comprehensive and exhaustive evaluation of each candidate circuit discussed in the Company's reply comments, including methodologies, assumptions, and sources that identify all potential benefits and costs of CES as appendices in its *2016 Smart Grid Report.*

9. Include the update on the feasibility of Fuse Saving device implementation with the accompanying methodology and qualitative and quantitative data in the Company's *2016 Smart Grid Report.*

10. Include a status update, including any benefits, of the implementation of capacitor bank, recloser, and regulator bank controls.

11. Provide a summary of ongoing efforts of completing a cost-benefit analysis of CFCIs, including alternative communication technologies such as AMI, in case the cost-benefit analysis is not ready for the *2016 Smart Grid Report.*

12. Provide an update, including milestones, of its planned transition to a new, more powerful circuit analysis application. PacifiCorp should also provide an evaluation of the expected impact of the new circuit analysis on the potential for CVR application.

13. Describe in the *2016 Smart Grid Report* how lessons learned from the irrigation TOU program can be applied to the other TOU programs offered by the Company.

14. Provide a quantitative and qualitative comparison of the Cool Keeper program's performance before and after the efficiency improvements in the *2016 Smart Grid Report.*

15. Provide a comprehensive analysis, including methodologies, and qualitative and quantitative data of possible benefits and costs, of the Company's collaborative analysis of DER integration.

PROPOSED COMMISSION MOTION:

PacifiCorp's *2015 Smart Grid Report* be accepted with Staff's recommendations set forth immediately above in the "Recommendations" part of this memorandum.