

ORDER NO. 15 3 14

ENTERED OCT 13 2015

**BEFORE THE PUBLIC UTILITY COMMISSION
OF OREGON**

UM 1657

In the Matter of

PORTLAND GENERAL ELECTRIC
COMPANY,

Annual Smart Grid Report.

ORDER

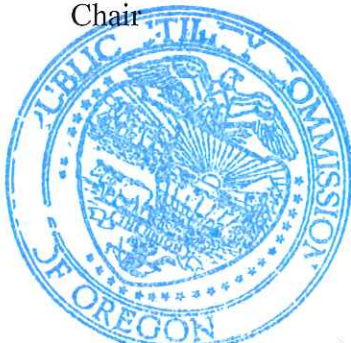
DISPOSITION: STAFF'S RECOMMENDATION ADOPTED AS AMENDED

This order memorializes our decision, made and effective at the October 12, 2015 Special Public Meeting, to adopt Staff's recommendation with one addition. To Staff's proposed recommendation, we add the requirement that Portland General Electric Company provide an interim update on its efforts to develop a vision and road map as part of its 2016 Smart Grid report at a Commission workshop. The Staff Report with the recommendation is attached as Appendix A.

Dated this 13 day of October, 2015, at Salem, Oregon.

COMMISSIONER ACKERMAN WAS
UNAVAILABLE FOR SIGNATURE

Susan K. Ackerman
Chair



A handwritten signature in blue ink, appearing to read "John Savage".

John Savage
Commissioner

A handwritten signature in blue ink, appearing to read "Stephen M. Bloom".

Stephen M. Bloom
Commissioner

A party may request rehearing or reconsideration of this order under ORS 756.561. A request for rehearing or reconsideration must be filed with the Commission within 60 days of the date of service of this order. The request must comply with the requirements in OAR 860-001-0720. A copy of the request must also be served on each party to the proceedings as provided in OAR 860-001-0180(2). A party may appeal this order by filing a petition for review with the Circuit Court for Marion County in compliance with ORS 183.484.

PUBLIC UTILITY COMMISSION OF OREGON
STAFF REPORT
SPECIAL PUBLIC MEETING DATE: October 12, 2015

REGULAR X CONSENT _____ EFFECTIVE DATE _____ N/A _____

DATE: September 14, 2015

TO: Public Utility Commission

FROM: Michael Breish *MB*

THROUGH: Jason Eisdorfer and Aster Adams

SUBJECT: PORTLAND GENERAL ELECTRIC: (Docket No. UM 1657) Annual Smart Grid Report.

STAFF RECOMMENDATION:

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

DISCUSSION:

Background

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.

Docket No. UM 1657
September 14, 2015
Page 2

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 are 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

The Commission accepted PGE's second *Smart Grid Report* (the 2014 report) as having met the requirements of Order No. 12-158.² At the same time, in its order accepting the 2014 report, Order No. 14-333, the Commission adopted a combined list of Staff and Commission recommendations for PGE's *2015 Smart Grid Report*.³ The recommendations adopted by the Commission were as follows:

1. In the first quarter of 2015, PGE should report to the Commission on the findings from the CVR pilot program and the Company's next steps for expansion of the CVR program.
2. In the first quarter of 2015, PGE should provide the Commission: (1) an evaluation of the Company's Critical Peak Pricing (CPP) program; (2) any recommended changes; and (3) next steps for the CPP program.
3. Before the next report, PGE should conduct workshops, including one with the Commissioners, to explore how best to measure and track benefits of smart grid investments such as:
 - a. Improved power reliability and safety
 - b. Improved system visibility
 - c. Fewer and shorter outages
 - d. Faster outage/fault identification
 - e. Quicker, more efficient customer service
 - f. Extend life of assets and minimize asset downtime or death

¹ Commission Order No. 12-158, page 4, Docket No. UM 1460, May 8, 2012.

² Commission Order No. 14-333, Docket No. UM 1657, October 1, 2014.

³ *Ibid.*

Docket No. UM 1657
September 14, 2015
Page 3

- g. New customer services
- h. Integration with demand response and distribution generation resources

As part of the workshops, PGE should explore the development of metrics beyond the System Average Interruption Duration Index (SAIDI), System Average Interruption Frequency Index (SAIFI), and others currently in use.

4. Before the next report, PGE should report to the Commission on the Company's evaluation of deployment of more synchrophasors in its system.
5. In the next report, PGE should provide information on PGE's Smart Heating, Ventilating, and Air Conditioning, and the Smart Thermostats pilot, including what will be tested and how success will be measured.
6. In the next report, PGE should share lessons learned from the Salem Smart Power Project and how results will be: (a) documented and shared; (b) built upon going forward; and (c) evaluated in terms of cost effectiveness.
7. PGE should document use of smart inverters in its service area and report on future initiatives.
8. In the next report, PGE should report on its evaluation of whether to actively promote voluntary residential and small commercial time of use pricing programs.

As explained in more detail in this Staff report, PGE complied with most of the recommendations in Order No. 14-333, which is the order arising from PGE's 2014 report. PGE's report is consistent with the Commission's reporting requirements outlined in Order No. 12-158.

Staff 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. 12-158⁴; and

⁴ This should also include incremental additions and updates of all elements of the first report. See Order No. 12-158 at 4.

Docket No. UM 1657
September 14, 2015
Page 4

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

On April 15, 2015, prior to filing its report, PGE held a smart grid workshop to receive and consider feedback from stakeholders on its *2015 Smart Grid Draft Report*. PGE submitted its third annual smart grid report on May 28, 2015, per Commission requirements found in Order No. 12-158.⁵

Interested parties were asked to file written comments on PGE's *2015 Smart Grid Report* by July 10, 2015. The NW Energy Coalition (NWECC) and the Citizen's Utility Board (CUB) filed written comments. In its reply comments filed on August 14, 2015, PGE addressed Staff's and the two interveners' comments. PGE also held a phone call with Staff on July 22, 2015, in regard to Staff's comments.

Analysis

Overall, PGE's *2015 Smart Grid Report's* content organization and presentation have improved compared to the previous report, providing readers easier access to a more comprehensive idea of where PGE's smart grid efforts currently stand as well as the direction in which the Company is taking smart grid.

The main body of the report, which includes current and future efforts, research and development, and related activities, is streamlined compared to previous reports. An issue Staff and CUB found with this year's report, however, is the conspicuous absence of cost and benefits of projects, both in individual descriptions and compiled in an appendix, as was found in PGE's *2014 Smart Grid Report*. This issue will be addressed later in this Staff report.

PGE's response to recommendations adopted in Order No. 14-333

Below Staff addresses each of the requirements from Order No. 14-333, the order resulting from PGE's *2014 Smart Grid Report*.

Requirement #1: Report re: Conservation Voltage Reduction (CVR) Pilot Program and next steps.

Staff appreciates PGE's final pilot CVR report submitted in the Docket No. UM 1657 smart grid docket on December 8, 2014. This report was found as Appendix Four in its

⁵ Commission Order No. 12-158, at page 4, Docket No. UM 1460, May 8, 2012.

Docket No. UM 1657
September 14, 2015
Page 5

2015 Smart Grid Report. Staff found that it sufficiently and succinctly informed the Commission of the Company's recent and planned CVR efforts. The Company's preliminary results from the CVR pilot are promising and exciting: from implementation at two transformers, the Company calculated that energy savings were 2.3 percent and 1.4 percent for the "winter" and "summer" months, respectively, and that the benefit-cost ratio was 3.77.⁶ From an initial screening of potential qualifying transformers, PGE estimates that implementation of CVR at 94 transformers currently equipped with necessary communication equipment could yield annual energy savings of approximately 142,934 MWh, or approximately 16 aMW. PGE states that further screening may identify additional qualifying transformers.

Staff understands that, given the manual intervention required to successfully operate the CVR pilot project, PGE first must upgrade certain communication and analytics hardware and software to enable an automated, and therefore an expanded and more effective, CVR system.⁷ However, in the order acknowledging PGE's 2013 Integrated Resource Plan (IRP), the Commission required the Company to include a portfolio level analysis of CVR in its next IRP.⁸ PGE is currently holding workshops regarding the Company's 2016 IRP, where the Company has indicated that CVR is one option for demand-side resources. Staff will monitor these discussions and preliminary plans to ensure that CVR is included to its full technical extent.

Requirement #2: Report re: Critical Peak Pricing (CPP) Program, recommended changes, and next steps.

Staff finds PGE's CPP report, which was originally filed in the Docket No. UM 1427 CPP pilot docket, is sufficient to meet the Commission's recommendation in Order No. 14-333.⁹ The report reflects that the pilot produced valuable insight into customer participation and opinions as well as data indicating the performance of the program's load shaping during critical peak events in both summer and winter months. DNV GL, the third party hired to evaluate the pilot, produced a comprehensive report that includes major finds such as:

- The pilot produced load reductions for both winter and summer: the average drop for a single-family home in the winter ranged between 0.2kW and 0.4kW, and was as high as 0.7kW. Due to a lack of hot days, summer drops could not be

⁶ The "winter" months were November through April and "summer" May through October;" present value of system benefits were \$2,530,945 and present value of costs were \$671,872.

⁷ PGE *2015 Smart Grid Report*, page 64, Docket No. UM 1657, May 28, 2015.

⁸ Commission Order No. 14-415, Appendix A, page 1, LC 56, December 2, 2014.

⁹ PGE's *Critical Peak Pricing Pilot Report*, Docket No. UM 1427, May 30, 2014.

Docket No. UM 1657
September 14, 2015
Page 6

quantified, though DNV GL states that load impacts were substantial from visual inspection of load curves.¹⁰

- Access to pre-program data is crucial to determine customers' responsiveness to a new time-of-use (TOU) program as well as to establish a reliable baseline. Because participating customers' pre-program data was unavailable, DNV GL had to rely on usage patterns from "the average PGE customer" for comparison purposes.¹¹ This insufficient data comparison prevented DNV GL from determining whether the participants' consumption patterns were in response to the TOU rate, or if they happened to conform i.e., they were already existing.
- The main reason customers chose to participate was to save money.
- Of a total of 996 pilot participants, 444, or approximately 45 percent, dropped out; of those 45 percent, 131 participants, or approximately 43 percent, were dropped because of "eligibility changes," such as customer relocation and alternative bill payments plans.
- Of the customers that chose to drop out (the remaining 313), 38 percent chose to leave because their respective bills increased after joining the program. Twenty nine percent dropped because they had difficulty reducing or shifting electric usage.

Staff expressed concern in its initial comments regarding two crucial components of the CPP pilot that reflected DNV GL recommendations for PGE in future program implementation: quality and robust data, and customer experience. Deficiencies with data practices and customer engagement can substantially affect the outcome, analysis, and conclusions of any demand-side management effort. If a pilot performs poorly due to an inaccurate baseline or ineffective marketing, future effort into implementing programs can be hampered. DNV GL suggested that PGE actively invest into those two areas to avoid such a situation and Staff echoed those concerns.

In expressing concern about a "strong foundation" for future dynamic pricing programs in its analysis of the CPP pilot, Staff referenced PGE's request for deferral of a dynamic pricing pilot and a direct load control (DLC) pilot in Docket No. UM 1708. Staff addresses the interconnection of PGE's dynamic pricing pilots and the role of smart grid reports in such matters later in this document.

¹⁰ DNV GL claims that because of PGE's service territory's "very mild weather," and thus very few hot days, during the pilot's 2012 and 2013 operational years, "baselines could not be accurately calculated for these days, and thus there are no load impact estimates for most summer events days."

¹¹ DNV GL, *PGE Critical Peak Pricing Pilot Report*, Attachment A, page 19, May 15, 2014.

Docket No. UM 1657
September 14, 2015
Page 7

In its initial comments, Staff also wondered why PGE was not pursuing additional action related to CPP beyond what was conducted in the Docket No. UM 1427 pilot, especially considering the recommendations that DNV GL provided that, if pursued and implemented, could result in more successful results. In its reply comments, PGE stated that though CPP did provide load curtailment, the Company believes other dynamic pricing models will serve customers better. PGE plans to determine "the best pricing program...in terms of overall cost effectiveness and customer satisfaction" through the pilot proposed in Docket No. UM 1708.¹² PGE concludes that additional research into CPP is not warranted at this time.¹³

Staff believes a place for CPP in PGE's portfolio of demand-side management is warranted, but only after careful and thorough consideration at the conclusion of the dynamic pricing pilot proposed in Docket No. UM 1708. Not only will the results of the dynamic pricing pilot allow PGE to determine which program or suite of programs is best for customers moving forward, of which CPP may be one, but also the design of incentive-based programs, such as "critical peak rebates" (CPR), may allow for a transition to CPP, which is cheaper and produces greater demand reduction. Results from the U.S. Department of Energy's (U.S. DOE) recent report on time-based rates demonstrate that CPP on aggregate produces greater demand reductions while doing so at a higher benefit-cost ratio.¹⁴ To remedy the issue of customers enrolling and performing differently between CPR and CPP, U.S. DOE suggests that a transition from CPR to CPP is feasible. By training customers on CPR, they can learn how to reduce demand while avoiding penalties, and then after a period of time, switch to CPP where they are better prepared for the risk while saving the utility money by not paying incentives.¹⁵

Staff notes that PGE is preparing to deploy a dynamic pricing pilot program sometime in the next year, which was described in detail in Appendix 10 of the *2015 Smart Grid Report*. For two years, PGE will operate a behavioral demand response that will target approximately 7,000 customers. The pilot will be testing multiple pricing program features. Customers will first either be assigned to receive a peak time rebate (PTR) for successfully reducing demand, or will receive no financial incentive. Customers in both incentive categories will be assigned to one of four pricing schedules: 1) standard schedule 7, 2) day and night TOU, 3) peak only TOU, and 4) revised TOU.¹⁶ The pilot

¹² PGE Reply Comments, page 5, Docket No. UM 1657, August 14, 2015.

¹³ Ibid.

¹⁴ *Interim Report on Customer Acceptance, Retention, and Response to Time-Based Rates from the Consumer Behavior Studies*, U.S. Department of Energy, page 37, June, 2015.

¹⁵ Ibid. page 34.

¹⁶ Standard schedule 7 contains no TOU alternation; it is unchanged from the existing schedule 7. Night and day TOU will have a night rate from 10:00PM to 6:00AM, while the day rate occurs in the remaining hours. The peak only TOU consists of one summer "on peak" rate from 3:00PM to 8:00PM and a winter

Docket No. UM 1657
September 14, 2015
Page 8

will also include a schedule 7 control group. PGE included the dynamic pricing pilot's expected operational characteristics such as a range of potential incentive rates, event lengths, and program triggers.

However, Staff notes that in Docket No. UM 1708, in which this dynamic pricing and the direct load control pilots were filed for deferral, Staff identified issues with PGE's baseline methodology, derate factor, minimum event calling, and definition of success.¹⁷ Staff also suggested a number of additional requirements in order to gather information to develop more robust demand response (DR) programs in the future. PGE agreed to these modifications and suggestions. Staff would like to see results of the stakeholder process for developing a cost-effective methodology, the exploration of cycling load, tracking of customer fatigue, and the exploration of enabling technologies included in future smart grid reports when the results become available.¹⁸

Regardless of how PGE's portfolio of dynamic pricing programs develops, Staff believes that all varieties of time-based pricing should be considered and reevaluated as utilities incorporate greater demand-side management activities into load balancing and resource planning. After all, consumers' behavior and knowledge will be changing as well, making previous conclusions about program efficacy obsolete.

Requirement #3: Smart Grid Metrics to measure and track benefits of smart grid investments.

PGE hosted a series of workshops in between smart grid reports in response to the Commission recommendation. These productive workshops guided PGE in producing an entire appendix consisting of five pages and nine tables that are generally split into either system reliability or customer engagement with one table devoted to asset optimization. Staff finds this initial set of metrics to be a good start in meeting Staff and the Commission's shared goal of increasing transparency and subsequent measurement of smart grid benefits.

Below are some notable metrics with accompanying Staff comments:

1. Corporate and regional reliability metrics

"on peak" rate from 7:00AM to 10:00AM and from 3:00PM to 8:00PM. The revised TOU maintains the same "on peak" timeframes from the peak only, but includes additional "mid peak" prices from 10:00AM to 3:00PM and from 8:00PM to 10:00PM in both summer and winter seasons.

¹⁷ The Commission approved deferral for the two pilot programs in Docket No. UM 1708. See Order No. 15-203.

¹⁸ See PGE's response to Staff's recommended modifications to the two residential demand response pilots, Docket No. UM 1708, June 10, 2015.

Docket No. UM 1657
September 14, 2015
Page 9

PGE included regional (western, central, eastern, southern) and then overall SAIDI, SAIFI, MAIFI and CAIDI data. The amount and granularity of the provided data is helpful and reveals that an increase in major event days in 2013 and 2014 has consequentially impacted utility wide SAIDI. Staff will work with PGE to determine if a section of the smart grid metrics appendix can be devoted to general reasons for changes in reliability metrics.

2. Number of customers participating in DR

Staff is encouraged by the relatively significant increase of commercial customers participating in DR from 2013 to 2014.¹⁹ If possible, an explanation accompanying significant changes demonstrated in the program participation metrics would be helpful. Doing so would add another dimension of information that could ultimately help correlate or even determine causal relationships between program participation and either program design or exogenous factors.

3. Energy Information Services across all customer classes

Residential customer participation in "energy information services" is 22.4 percent, and commercial and industrial customer participation in corresponding energy information services is 2.4 and 14.6 percent, respectively. Successful smart grid integration, specifically enhanced demand-side management applications, requires greater customer engagement. Statistics like these suggest a decent foundation exists, but much more can be done to increase participation in existing programs to better prepare for more involved, future roll outs. Staff addresses customer marketing, education and engagement later in this report.

Staff commends PGE on the progress achieved so far in terms of smart grid development and transparency. As intended, these metrics indicate where greater attention can be focused. In PGE's reply comments, the Company stated its continued commitment to improving the metrics through the following iterative process²⁰:

1. Research industry best practices
2. Define metrics
3. Stakeholder feedback

¹⁹ Three commercial customers were participating in some type of DR program in 2013; the number increased to 23 in 2014. *PGE 2015 Smart Grid Report*, Appendix 2, page 50, June 1, 2015.

²⁰ PGE reply comments, page 6, Docket No. UM 1657, August 14, 2015.

Docket No. UM 1657
September 14, 2015
Page 10

4. Capture/report data
5. Evaluate metric effectiveness

The Company later states that "PGE acknowledges and agrees with OPUC Staff's comments that there could be opportunities for additional metrics in the future" and that future metrics can be added to the smart grid reports using the iterative process described above. Below are metrics that Staff would like PGE to consider including in the 2016 Smart Grid Report and looks forward to participating in the process:

1. Total number of customers (residential, commercial, industrial)
2. Percentage of total customers utilizing energy tracker
3. Percentage of total customers utilizing energy expert
4. Number of customers actively choosing no AMI meter
5. Number of escalated customer complaints related to the accuracy, functioning, or installation of advanced meters²¹
6. Load impact in MW of peak load reduction from the summer peak and from winter peak due to smart grid-enabled, utility administered DR programs (in total and by customer class)²²

Requirement #4: Report re: evaluation and implementation of synchrophasors.

PGE continues to research and invest in synchrophasors and the accompanying hardware and software. In the synchrophasor report provided in appendix 6 of the 2015 *Smart Grid Report*, PGE states "the goal of the X-Phase Project [the integration of synchrophasor technology] is to develop a wide-area network of PMUs [phasor measurement units] encompassing all PGE Transmission Substations, which will be developed thru a multi-year, multi-phase roll out."²³ Ultimately the X-Phase Project will result in a network of connected synchrophasor hardware that enables PGE to utilize the data to:

- Enhance situational awareness that improves the reliability, efficiency and performance of the transmission system;

²¹ PG&E *Smart Grid Annual Report – 2014*, Chapter 3, page 70, December 18, 2008.

²² *Ibid.*, page 67.

²³ PGE 2015 *Smart Grid Report*, Appendix 6, page 75, Docket No. UM 1657, June 1, 2015.

Docket No. UM 1657
September 14, 2015
Page 11

- Solving and preventing problems before they happen; and
- Conduct post-event analysis.²⁴

Staff asked two questions regarding synchrophasors in its comments: if PGE could clarify a discrepancy regarding planned synchrophasor installations in 2015 found and whether PGE is participating in Western Electricity Coordinating Council's (WECC) region-wide synchrophasor project. PGE replied, clarifying that over the next two years, five substations will receive synchrophasor technology as well as the supporting communications and data infrastructure.²⁵ Two of the substations will undergo these upgrades in 2015, with the intent of completing the remaining in 2016. PGE's included cost estimate for the synchrophasor work on the five substations is \$418,714.00

Though PGE actively is coordinating with WECC for data handling, PGE is not participating in WECC's Peak Reliability or its Western Interconnection Synchrophasor Project; however, the Company is assessing joining the latter. Short-term information is indeed helpful, but Staff would like to see PGE's Project-X scope and timeline in ensuing smart grid reports, as well as the associated, projected costs and benefits.

Requirement #5: Information regarding the smart thermostat pilot, including what will be tested and how success will be measured.

Direct load control (DLC) technology, with the essential customer education and participation, provides for more affordable, efficient and reliable power. DLC programs across the nation have already demonstrated consistent benefits, and Staff believes PGE's residential customers have the potential to demonstrate similar, positive results that can ultimately lead to greater DR in PGE's resource planning once the Company's Customer Engagement Transformation is complete. The first DR pilot PGE's residential customer will have access to is the Company's proposed smart thermostat pilot. PGE included preliminary information on the design and operation of this pilot in Appendix 10. In its opening comments, Staff stated that PGE provided insufficient information in meeting the Commission's adopted recommendation relating to the smart thermostat pilot in Order No. 14-333.²⁶ Contrasted with the accompanying dynamic pricing pilot information, Staff found little operational detail. Staff had to utilize information found in the related filing in Docket No. UM 1708 to fully answer the "what" and "how" asked by the Commission.

²⁴ Ibid.

²⁵ Hardware includes the PMU and the phasor data concentrator. Communications infrastructure includes the fiber optic cables

²⁶ Staff's Comments, pages 6-7, Docket No. UM 1657, July 10, 2015.

Docket No. UM 1657
September 14, 2015
Page 12

PGE addressed Staff's concerns in the Company's reply comments by referencing misaligned timing of filings in both cases and the ultimate Commission approval in Docket No. UM 1708. Staff recognizes the limitations posed by these overlapping dockets and will work with PGE in the future if and when instances like the DLC recur. Staff would like to see any preliminary results or findings from the smart thermostat pilot in next year's smart grid report.

Requirement #6: Report re: lessons learned from Salem Smart Power Project (SSPP) including how results will be: (a) documented and shared; (b) built upon going forward; and (c) evaluated in terms of cost effectiveness.

PGE included a report on the SSPP in Appendix 7 of the *2015 Smart Grid Report* that contains two sections: lessons learned so far and an overview of the SSPP use and valuation tests. Planning, developing, constructing and then operating the SSPP to date, five years in total, were monumental tasks for all stakeholders involved as made clear in the lessons learned section. PGE provided six lessons learned:

1. Thoroughly vet vendors' capabilities and financial wherewithal
2. Leverage outside resources to reduce risk
3. Assemble a strong, adaptable engineering and project management team
4. Do lots of testing
5. Take plenty of precautions
6. Understand the impact of the rules for a new game

The sixth lesson, "understand the impact of the rules for a new game," not only discusses PGE's novel role as a contractor, but underscores why the first five lessons, which are general enough to be associated with a new project in any industry, are yet novel for PGE: utilities have historically avoided risky and new ventures like the SSPP. Due to PGE's involvement in the SSPP, Staff believes the Company is now better prepared to engage similar projects in terms of capabilities and unconventionality as smart grid takes a greater role in resource and transmission planning.

Despite the uncertainties and risks PGE faced, the other section of the SSPP report indicates overall the SSPP has succeeded so far in meeting the goals established by the U.S. DOE and the Pacific NW Smart Grid Demonstration Project (SGDP). At the time of the *2015 Smart Grid Report's* submission, 12 use and valuation cases for the SSPP have been identified and have successfully been tested or are currently being

Docket No. UM 1657
September 14, 2015
Page 13

evaluated. SGDP's five contractual assets were addressed in these 12 and were all proven successful.²⁷ Staff finds that PGE's successful demonstration of transactive signaling with other SSPP assets, like DR and accessing power stored in the battery, to be particularly important as this function will be critical in the dynamic, decentralized capabilities of smart grids.

PGE states that upon determining funding and staffing constraints, PGE will submit additional use and valuation cases for late 2015 and 2016 to the Salem Smart Power Center (SSPC) advisory committee, who will then assess "the highest and best programmatic use of the facility" and make recommendations to the PGE Executive Management most likely in 2015.²⁸

Staff commends PGE on the progress made so far, but finds PGE did not respond to the full request of the Commission's requirement relating to the SSPP in Order No. 14-333, namely how future SSPP actions and results will be documented and shared, and the cost effectiveness of each SSPP function. Given the breadth of use cases the SSPP has accomplished or is currently being evaluated, Staff proposes that PGE work with Staff and other SSPP stakeholders to produce a comprehensive report with subsequent, recurring updates as work continues on the SSPP.

Requirement #7: Information regarding use of smart inverters and future initiatives

PGE succinctly described current and planned smart inverter efforts in appendix 8 of the *2015 Smart Grid Report*. PGE is currently operating 20 smart inverters at the SSPC to test transactional control and frequency regulation functionalities. Additionally, PGE owns or operates 19 smart inverters at 12 photovoltaic (PV) solar installations totaling 5.3 MW (DC) of nameplate capacity. Demonstrated abilities include power factor adjustment, curtailment control and ramp-up rate adjustment.

PGE states that "a wider scale of enablement and adoption of smart inverter technology is required" in order for the Company to realize the benefits of smart inverters at a utility scale.²⁹ PGE plans to encourage broader adoption of the technology by advocating for widespread adoption of smart inverters and continued research and development on how to maximize smart inverter benefits. Staff is satisfied with the Company's efforts related to smart inverters and anticipates future developments in the *2016 Smart Grid Report*.

²⁷ SGDP contractually-required assets: 1) Residential DR, 2) Commercial DR, 3) Commercial dispatchable standby generation - grid connected, 4) battery storage - grid connected, and 5) distributed switching and commercial microgrid.

²⁸ PGE *2015 Smart Grid Report*, page 82, UM 1657, June 1, 2015.

²⁹ PGE *2015 Smart Grid Report*, page 89, Docket No. UM 1657, June 1, 2015.

Docket No. UM 1657
September 14, 2015
Page 14

Requirement #8: Promotion of Residential and Small Commercial TOU Programs

PGE currently offers a TOU program to Schedule 7 and 12 residential and commercial customers, respectively. Staff noted in its reply comments that the same description for the TOU program in the *2014 Smart Grid Report* was used in the *2015 Smart Grid Report*. In this repeated description, PGE states that “interest in the program has grown with the availability of interval data and administrative costs have been reduced with the deployment of AMI.”³⁰ However, PGE also claims that, at the direction of the Portfolio Oversight Committee [POC], promotion of the TOU program has been limited. Staff expressed concern over this apparent gridlock and whether PGE was doing enough to advance TOU pricing.

PGE stated in its reply comments that the existing TOU program “has proven unfavorable to customers,” a position seemingly contrary to that originally stated in the report.³¹ Instead of offering an undesirable TOU program to customers, PGE is deploying new TOU schedules as part of the Company's dynamic pricing pilot. As described earlier in this memo under requirement #2, the pricing schemes to be used in the dynamic pricing pilot will be composed of three TOU variations and one control group using the standard rate. Staff finds that the TOU plans PGE will deploy through this pilot to be satisfactory in term of researching and testing current demand-side management options for customers. However, other TOU options are currently available and are being tested or have been tested successfully by other utilities, such as variable peak pricing, TOU plans accompanied by a programmable communicating thermostat, and plans designated as opt-out.³²

Staff would like PGE to conduct a stakeholder process that will include Staff and CUB when PGE considers future pricing programs, ranging from pilots to full scale rollouts, to ensure that PGE is considering all available options and that the programs are designed such that they will serve customers best in the fullest extent and also ensure they are prepared for Staff and Commission scrutiny. Additionally, Staff would like to see preliminary results and findings from the dynamic pricing pilot in future smart grid reports.

³⁰ Ibid., 31.

³¹ PGE Reply Comments, page 5, Docket No. UM 1657, August 14, 2015.

³² Interim Report on Customer Acceptance, Retention, and Response to Time-Based Rates from the Consumer Behavior Studies, pages 11-12, US Department of Energy, June, 2015.

Docket No. UM 1657
September 14, 2015
Page 15

Additional Comments

Customer Education

Customer education and participation are crucial components of any successful demand-side management program. As PGE implements more DR, dynamic pricing, distributed energy programs and energy efficiency, an informed and proactive customer base is integral to reliable performance, which is essential in PGE's future resource planning. PGE is entering a new phase in customer relations as they disseminate greater information and require more of the participating customers. Utilities across the nation who are engaging in comparable smart grid programs find themselves in similar positions and are proactively testing various customer curriculum to educate customers.³³ PGE stated in its reply comments that the Company "is developing a customer communications plan as a part of the 2015 smart grid road map development."³⁴ Staff is looking forward to the results of this effort. Staff would like to begin a recurring, informal stakeholder meeting where Staff, CUB, PGE and any third-party program managers meet to discuss customer education, outreach, marketing, and related strategies. Staff believes an active stakeholder process is one way to achieve successful customer participation in demand-side management opportunities.

Non-wire Alternatives to Distribution Upgrades

Staff in its comments inquired whether PGE was exploring alternatives to traditional transmission and distribution infrastructure upgrades, like solar PV installations or battery storage. PGE indicated that in addition to the transmission and distribution Strategic Asset Management department that "evaluates various risk reduction solutions and advocates for proactive investments...that demonstrate the greatest value to customers," the Company is currently researching storage as a non-wire alternative.³⁵ Staff would like to see the status of this ongoing research in the *2016 Smart Grid Report*, including possible pilot projects.

Cost/Benefit Analyses

Unlike the *2014 Smart Grid Report*, only a few projects contained cost or benefit information. The *2015 Smart Grid Report* also had no aggregated project table that also contained a brief project description and projected cost, an addition that Staff found

³³ *Interim Report on Customer Acceptance, Retention, and Response to Time-Based Rates from the Consumer Behavior Studies*, US Department of Energy, June, 2015.

³⁴ PGE Reply Comments, page 9, Docket No. UM 1657, August 14, 2015.

³⁵ *Ibid.*, 8.

Docket No. UM 1657
September 14, 2015
Page 16

incredibly helpful.³⁶ Staff would like to see a table in future smart grid reports that summarizes all research, development and pilot projects, their respective descriptions, expected benefits and costs. Including cost/benefit information would aid in the evaluation of PGE's smart grid efforts' alignment with the pertinent smart grid guidelines.³⁷

Scope of smart grid reports

PGE explained to Staff that it did not believe the smart grid docket was an appropriate place to raise concerns and issues regarding other dockets that already were approved by the Commission, e.g., Docket No. UM 1708. Staff understands PGE's concern, but believes that any topic under the purview of Order No. 12-158 in Docket No. UM 1460 should be covered in the respective utility's smart grid docket, including comments expressed in any topics' respective docket. Staff believes the smart grid reports should be comprehensive and reflect the inherent interlinked nature of all smart grid efforts. By analyzing particular issues in a larger context, i.e., smart grid, lessons learned or instances found in other related matters can be more readily discovered. Doing so enables a more efficient and robust smart grid development process. Staff beliefs rely on Order No. 12-158 requirements that utilities must list and describe all smart grid opportunities and related activities undertaken in order to optimize service delivery, demand and asset utilization.

Collaboration

PGE and Staff shared the goal to increase future stakeholder participation during the preparation of the smart grid report in order to deliver an improved draft smart grid report product. Staff agreed, hence why requirements within this report have more stakeholder processes as part of the Staff recommendation. Staff is looking forward to working with PGE in developing more robust smart grid programs.

Parties' Comments

NWEC and CUB provided written comments in this docket. Each is summarized below:

NWEC Comments

NWEC finds the *2015 Smart Grid Report* to be well organized and provides a sufficient level of detail on most of projects under discussion. NWEC finds that PGE's smart grid efforts are only becoming more sophisticated and mature, but are also producing

³⁶ This table appeared as appendix B in the *2014 Smart Grid Report*.

³⁷ Commission Order No. 12-158, page 7, Docket No. UM 1460, May 8, 2012.

Docket No. UM 1657
September 14, 2015
Page 17

benefits for customers. NWECC observes PGE's current smart grid strategy is already demonstrating features of the "two way grid of the future," but recognizes PGE will face growing complexity and choices to manage the system while providing more flexibility and choice for customers.

NWECC appreciates the collaborative process PGE is undertaking in producing additions to the report like the reliability metrics found in Appendix 2. NWECC continues to focus its response on two broad issues: 1) the connection between energy efficiency and smart grid development, and 2) the importance of ensuring that low-income customers are fairly treated through shared benefits and avoidance of disparate treatment as a result of smart grid programs.

NWECC continues with the following comments regarding current and future smart grid topics. Staff's responses accompany each bullet:

- NWECC continues to be concerned about smart grid initiatives that can have impacts on low income customers, such as TOU pricing and prepay programs. PGE claims they will include community action agencies in the design of any prepaid metering pilot design.
 - *Staff response: Staff agrees that a thorough and inclusive stakeholder process is essential if PGE proceeds with any sort of prepaid metering pilot. Staff appreciates PGE's responsiveness to NWECC's concerns.*
- NWECC underscores the greater potential of energy efficiency efforts in the context of smart grid: aspects like customer behavior, choice and response can be incorporated into PGE's greater focus on customer data in order to capture the full value of energy efficiency. The confluence of energy efficiency and smart grid can lead to "short-term conservation response and long-term energy savings."³⁸
 - *Staff response: Staff concurs and anticipates PGE's investments in data infrastructure will allow the Company to capture greater savings from interrelated demand-side management efforts.*
- NWECC remarks that as PGE smart grid programs yield greater reliance on data, associated risk related to data quality, integrity, security, and privacy increases. Because data use will only increase with greater smart grid proliferation, NWECC recommends the overall topic receive greater attention through the Commission's

³⁸ NWECC Comments on PGE's 2015 Smart Grid Report, page 3, UM 1657, July 10, 2015.

Docket No. UM 1657
September 14, 2015
Page 18

processes. Doing so may help utilities find a balance of value and risk for data utilization.

- *Staff response: Staff agrees that data's increasing role in utility smart grid operations warrants scrutiny and protective measures. The Commission's Guidelines for Utility Action (3) requires utilities to protect the privacy of customer data. Therefore, Staff concurs that the Company must include extensive discussion of privacy and access to customer data in its future reports.*
- NWEAC finds that the current IRP is not comprehensive enough to fully assess and include smart grid investments as supply-side resource alternatives in resource planning. NWEAC proposes that the IRP be augmented with a "distribution resource plan" (DRP), similar to the process that the California Public Utilities Commission recently required its respective utilities to conduct. A DRP would leverage similar cost/least risk analyses used in the IRP, but would grant additional flexibility in order to assess the growing number of smart grid technologies that experience rapid development unlike traditional supply-side resources.
 - *Staff response: Staff appreciates NWEAC's suggestion regarding the DRP. Staff also follows these developments in California and other states like New York's REV model. However, issues related to IRPs should be raised in IRP dockets. Staff agrees with PGE that the Commission already acknowledges smart grid technologies in PGE's current IRP process. Further, Staff believes that Order No. 12-158 specifically requires electric utilities to describe investments and technologies that enhance distributed resources and the distribution network. See Order No. 12-158 at 3 and 5. Therefore, Staff would like to see more discussion of how smart grid enhances the utility distribution network.*

CUB'S Comments

CUB commends PGE for the perceived improvement of the 2015 *Smart Grid Report's* organizational structure. CUB found that the report was better organized and easier to read than previous reports, in part due to the succinct descriptions of projects. CUB also found that PGE's inclusion of time road maps, demarcation of past, present, and future projects; and refined project descriptions provided an overall better direction of where PGE is heading in regard to smart grid technologies.

Docket No. UM 1657
September 14, 2015
Page 19

CUB continues with the following comments regarding current and future smart grid topics. Staff's responses accompany each bullet:

- CUB found PGE's *2015 Smart Grid Report* offered fewer project cost and benefit components for included projects than in previous reports. CUB mentioned that throughout the *2014 Smart Grid Report* for example, individual projects had costs listed within the report and not just in the appendices.
 - *Staff response: Staff agrees that PGE should be including estimated costs and benefits for every project when available. Staff addresses this in a recommendation below.*
- CUB is most concerned about PGE's "prepaid metering" program described in the 2015 report's "Future Smart Grid Investments" section. CUB is concerned that what PGE describes as an opportunity to manage energy spending and to encourage customer engagement with energy usage can primarily end up as a tool to handling customer billing matters such as credit issues or arrearages. CUB references cases where prepaid metering negatively affected consumers, such as low-income individuals who were without electricity during the last few days of the month. CUB notes the mischaracterizing conservation marketing that is often associated with prepaid metering that ultimately disadvantages customers who are unable to choose to do so. CUB reminded PGE that the Company agreed in Docket No. UE 189 to meet all parties including Consumer Action Agencies prior to proposing a pilot. Particularly, CUB is concerned about the timing of stakeholder involvement and states that "PGE must engage stakeholders before making the decision to offer a pilot and before getting to the pilot design stage."
 - *Staff response: Staff shares CUB's concern regarding the design and implementation of a prepaid metering program of any scale within PGE's service territory. Though PGE sufficiently addressed CUB's concerns in the Company's reply comments and the idea still resides as a future initiative, Staff expects a full stakeholder process to consider all solutions that prepaid metering is purported to address.*

Recommendations

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

- In its next smart grid report, PGE provide the results of the dynamic pricing stakeholder process for developing a cost-effective methodology, the exploration

Docket No. UM 1657
September 14, 2015
Page 20

of cycling load, tracking of customer fatigue, and the exploration of enabling technologies.

- In its next smart grid report, PGE include any preliminary results and findings from its dynamic pricing pilot and DLC pilot.
- PGE should continue the stakeholder process for researching and including additional reliability and operational metrics in its next smart grid report as well to improve existing metrics.
- In its next smart grid report, PGE include Project-X's scope and timeline as well as the projected costs and benefits.
- PGE work with Staff and other SSPP stakeholders to produce a comprehensive report with subsequent, reoccurring updates as work continues on the SSPP.
- PGE conduct a stakeholder process with Staff and stakeholders when it considers future pricing programs in order to assist and guide pilot and program design and implementation.
- PGE continue to document and report on efforts related to smart inverters.
- PGE begin a recurring stakeholder meeting where Staff and stakeholders discuss customer education, outreach, marketing, and related strategies.
- In its next smart grid report, PGE should include the status of non-wire alternative distribution upgrade research, including possible pilot projects.
- In future smart grid reports, PGE should provide a summarizing table of all research, development, and pilot projects, their respective descriptions, expected benefits and costs.

PROPOSED COMMISSION MOTION:

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

2015 PGE Smart Grid Report