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ACTION REQUEST RESPONSE

To: Public Service Commission

From: Division of Public Utilities
Chris Parker, Director
Artie Powell, Manager
Charles Peterson, Technical Consultant
Sam Liu, Utility Analyst

Date: September 4, 2012

Ref: Docket No. 12-035-88. Rocky Mountain Power's 2012 Corrected Smart Grid Monitoring Report cross-reference Docket No. 08-999-05 –Annual Report on Smart Grid Technology

RECOMMENDATION (Acknowledge, with recommendations for improvement)

The Division of Public Utilities (Division) recommends that the Public Service Commission (Commission) acknowledge Rocky Mountain Power's (Company) Report on Smart Grid Technologies (Report), including the recently filed Utah Addendum II. The Division concludes that the Report with Utah Addendum II substantially complies with the Commission Order of November 30, 2011 in Docket No. 08-999-05.

ISSUE

The Company filed its 2012 Smart Grid Annual Report on July 6, 2012 pursuant to the Commission's November 30, 2011 Order in Docket No. 08-999-05. The Company discovered that report has an automatic date function that displays the current date whenever the report is

opened. The Company filed its corrected report removing the automatic date function with the report date of June 29, 2012. On July 10, 2012, the Commission issued an Action Request for the Division to provide comments on the filing of the 2012 Smart Grid Annual Report. This memorandum represents the Division's response to the Commission's Action Request.

INTRODUCTION

The Company's Report is substantially similar in style and content to the report filed with the Commission in 2011. The Company started with a review of the relevant technologies for transmission, substation and distribution systems, including smart metering and home area networks to enable consumer demand response programs.

The Report focuses on technologies that can be readily integrated with existing infrastructure and do not require major electrical system changes. These technologies included advanced metering systems with demand response programs, distribution management systems, and transmission synchrophasors. The Company makes it clear that in its view the backbone of a smart grid is a sophisticated and expensive communications system. With the possible exception of the transmission synchrophasors which are currently under study, the Company continues to believe that the smart grid technologies are immature and not cost-beneficial. However, as these technologies evolve and mature they may become cost-beneficial in the future, and consequently merit continued monitoring.

In addition to reviewing the Report, the Division also held a meeting on August 1, 2012 with Company personnel Douglas Marx, Josh Jones and Dave Taylor, the Company's Utah regulatory manager. Cheryl Murray, of the Office of Consumer Services also attended the meeting. At the meeting the Commission's Order dated November 30, 2011 in Docket No. 08-999-05 (Order) was reviewed. After the meeting, the Division made follow-up comments and suggestions to the Company via e-mail.

The Division suggested to the Company that it may need to supplement its Report at least in certain areas in order to comply with the Order. Specifically, the Division recommended that the

Company expand its discussion of plug-in electric vehicles and the EMB Energy flywheel pilot project in northern Utah. The Division also suggested that in the future, the Company's reports include citations to sources consulted in developing the report. In response to the Division's suggestions, the Company recently filed its Utah Addendum II.

COMPLIANCE WITH COMMISSION ORDER

In its November 30, 2011 Order, the Commission directed the Company in future reports to include:

- 1) a discussion (including project/activity description, cost, status, results and pertinent cost/benefit information) of all smart-grid related projects and activities the Company is actually engaged in throughout its system (e.g., tests of transmission synchrophasors, energy storage projects, voltage support projects);
- 2) a discussion of any smart grid-like activities the Company is either considering or has implemented which accrue some of the benefits of smart grid;
- 3) a discussion of upgrades or changes the Company is making relative to potential smart grid implementation and the related benefit-cost analyses;
- 4) a list and description of smart grid pilot projects across the country being monitored by the Company;
- 5) a description of smart grid related activities and requirements in the Company's other jurisdictions;
- 6) an explanation of the interaction of smart grid, possible rate structures, and consumer behavior; and
- 7) a discussion of vehicle to grid applications in the Plug-In Electric Vehicle section of the Report.¹

In addition to these items, the Commission also directed the Company "to explain the relationship between the analysis provided in the Financial Summary and the demand side resource performance standards approved by the Commission in Docket No. 09-035-27...."²

The Company's Report was not organized in such a way that it was clear where and how it was responsive to the Commission's directives. However, the Division believes that along with Utah Addendum II, the Report for the most part contained the requested information. Below the Division summarizes how it believes the Report does, or does not, satisfy the Commission's directives.

¹ Public Service Commission, Report and Order, Docket No. 08-999-05, November 30, 2011, pp. 10-11.

² Ibid., p. 10.

Directives 1, 2, and 3

The Division believes that there is substantial overlap in directives 1, 2 and 3. Therefore they are summarized together.

The Report discusses the requirements and potential of advanced metering systems (AMS). AMS provides the data required to fully integrate meter reading, demand response, outage management, and distribution management functions. Advanced metering infrastructures (AMI) provide the same metering data levels as automated meter reading, or “drive-by” systems, but lack the direct customer notification and integration of in-home displays. Automatic meter reading (AMR) systems are typically defined as systems that only automate the manual meter reading process. PacifiCorp has installed AMR systems some of which are capable of migrating to a one-way fixed network system that meets the basic requirements of AMI.

The Report also describes Demand Response (DR) as one of the key requirements to encourage customers to change the time energy is utilized. This shift in consumption presumably will reduce the peak demand and increase the load factor on the electrical system. The PacifiCorp summer peak of 2011 was measured at 9,431 megawatts. System daily peaks for this time period are shown in Figure 3³. PacifiCorp has provided a comprehensive set of demand-side management (DSM) programs to reduce energy consumption and more effectively manage when energy is used, including management of seasonal peak loads. PacifiCorp has built a control network of participating customer end use loads of over 700 megawatts, with plans to add an additional 140 megawatts by the summer of 2014⁴. The Company states that it uses the most advanced control technology and load management practices in the industry that “demonstrate that the Company is actively engaged in improving the efficiency and management of its system by employing education, equipment, and price incentives to optimize system performance.”⁵

Based on recent industry research and utility pilot programs, PacifiCorp has identified several potential risks of Distribution Management System (DMS) programs, including Conservation Voltage Reduction (CVR) and Interactive Volt-Var Optimization (IVVO) implementation. Due

³ Report, page 15.

⁴ LC 52 - PacifiCorp's Revised 2011 Integrated Resource Plan Action Plan, January, 2012.

⁵ Report, page 16.

to low voltage of CVR implementation, residential customers complain of malfunctioning equipments, dim lights, shrunken TV screens, and longer duty cycle for constant energy appliances like resistive heaters, air conditioners and dryers;⁶ commercial and industrial customer complaints increased due to the lower voltage affecting sensitive customer equipment like hospital equipment, computer-controlled laboratory, tools and motors, as well as complaints about voltage sags and nuisance tripping, and expensive down-time affecting profitability.⁷ In 2012 PacifiCorp initiated a four-circuit CVR pilot in Washington State.⁸ PacifiCorp is planning to expand its study in Washington by adding an additional 25 circuits in the near future. PacifiCorp's analysis to date shows that CVR results in only minimal improvements that do not justify the additional costs.⁹

Centralized Energy Storage (CES) benefits a smart grid by its ability to integrate renewable energy sources, such as wind and solar, into an electricity delivery system that is dominated by fossil fuel generation.¹⁰ Several new technologies are currently being researched throughout the industry, including battery, pumped hydro, flywheel and compressed air energy storage. Battery and flywheel energy storage are currently the most promising technologies for widespread application in the utility industry.¹¹ The Company is engaged with EMB Energy in a pilot project in northern Utah to develop flywheel technology. The project is running behind schedule, but is expected to produce results in the next two years.

Transmission smart grid is generally synonymous with the phase measurement unit (PMU, or synchrophasor) and the communication network which links many PMUs to a central processor. Benefits for Transmission Synchrophasors have not yet been determined and are discussed further in the Activities section below. PacifiCorp has identified two locations within its transmission system, one is 230 kV line and the other is multiple-line 345 kV project – currently

⁶ Report, pages 22-23.

⁷ Ibid., page 23.

⁸ The CVR program resulted from a 2006 voter initiative. PacifiCorp is working with the Washington Commission's DSM Advisory Group. (see Report, pages 21-22).

⁹ Ibid., page 23.

¹⁰ Ibid., page 23.

¹¹ Ibid., page 24.

in the engineering phase and scheduled to be completed by March of 2013, where using real-time dynamic thermal line ratings (DLR) systems will be beneficial.

The Company is involved in the Western Electricity Coordinating Council's (WECC) West Interconnection Synchrophasor Project (WISP) which is a collaborative effort throughout the U.S. portion of the West Interconnection. With funding from WECC, PacifiCorp engages in planning, design, engineering and operational activities to identify and deploy synchrophasor technology at the most effective locations on PacifiCorp's system. The main purpose of the WISP program is to increase the coverage of PMUs (synchrophasors) throughout the west. PacifiCorp is currently working on the installation of synchrophasor data communication equipment at five transmission substation locations in the Company's eastern service territory.

Directives 4 and 5

PacifiCorp continues to monitor technological advances and developmental activities throughout the nation as more advanced metering and other smart grid related projects are built. This will allow for improved estimates of both costs and benefits. With large scale deployments progressing in California, Texas and Ontario and a myriad of pilots throughout the country, it is expected that the market leaders will become evident within the next few years.¹²

The Division believes that future reports should expand the discussion of smart grid roll-outs across the country. The Division does not mean that each and every smart grid project needs to be identified, but that there should be more discussion of specific programs. The increased detail should include the goals and expectations of the projects along with costs and expected benefits. For example, the Division has recently received an article published in POWER Magazine describing San Diego Gas & Electric's "All-Inclusive Smart Grid Vision." The article indicates that the program is cost-beneficial, at least from a California perspective.¹³ At a minimum, this article suggests to the Division that there may be more going on with smart grid than one would gather from the Company's Report.

¹² Report, page 4.

¹³ Dr. Gail Reitenbach, "Customers Motivate San Diego Gas & Electric's All-Inclusive Smart Grid Vision," *POWER*, August 2012, pp. 38-47.

Directive 6

The Company discusses the problem of consumer acceptance and sustainability (see for example on pages 3 and 4 of the report). The Report also includes a discussion of time of use rate structures in the Demand Response section on pages 14-17.

Directive 7

The Report mentions that the plug-in electric vehicle issues are being handled by a separate group within PacifiCorp and will not be addressed in this Report.¹⁴ At the August 1st meeting the Division suggested that this discussion needed to be significantly expanded in order to comply with the Commission's seventh directive.¹⁵ The Company supplemented its discussion of plug-in electric vehicles in the recently filed Utah Addendum II. The Division believes that this expanded discussion complies with the Commission's Order.

Relationship between DSM Performance Standards and Smart Grid Economics

After reviewing the Commission's Order dated October 7, 2009 in Docket No. 09-035-27, the Division interprets this directive to mean that the Company should present an organized discussion of the smart grid benefit and cost analyses in the framework of a DSM analysis. Specifically, the Company should discuss the five cost-benefit tests, the Utility Cost, Participant Cost, Ratepayer Impact Measure, and two forms of the Total Resource Cost tests in conjunction with its economic analysis of the smart grid programs. The Company did present a confidential analysis with supporting work papers showing that a comprehensive smart grid system was unlikely to be cost-beneficial at this time; however, the Report does not present this analysis in the form that a DSM report would have with some or all of the five cost tests.

Additional Issues

As alluded to above the Report is not organized to make it easy for a reader to identify where and how the Company has complied with its reporting directives from the Commission. The Division believes that the Company's future reports, at least in its Executive Summary, should have an

¹⁴ Report, page 36.

¹⁵ Anecdotally, the Division has witnessed the expansion of outlets for plug-in electric vehicles in northern Utah. For example, some Weber County libraries now provide reserved parking and facilities to accommodate these vehicles.

outline of how the Company has complied with Commission Orders and where in the report that compliance is demonstrated. The Report also alludes to outside reports and studies but provides no specific sources either in footnotes or a bibliography. The Division believes that future reports should provide specific references for readers who may want to follow up in more detail.

CONCLUSION AND RECOMMENDATIONS

The Company filed its smart grid monitoring report pursuant to the Commission's Order in Docket No. 08-999-05. The Report is substantially in compliance with the Commission's Order.

The Division has identified some weaknesses and flaws in the Report that it recommends be remedied in future reports. Future reports need to give more detail on smart grid-like projects the Company is actually working on—this recommendation is specifically made because the discussion of the EMB Energy Inc.'s flywheel storage project was thin. The Company needs to add footnotes and/or a bibliography citing sources. The Company needs to fully comply with Commission directives and demonstrate more clearly its compliance in the report. As highlighted above, future reports could contain more discussion of smart grid activities in other companies.

Despite these weaknesses, the Division recognizes that considerable effort went into the Report and believes that it substantially complies with the Commission Order. Therefore, the Division recommends that the Commission acknowledge the Report.

cc:

Dave Taylor, Rocky Mountain Power

Michele Beck, Office of Consumer Services