State of Utah
Department of Commerce
Division of Public Utilities

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Executive Director

THOMAS BRADY
Deputy Director

CHRIS PARKER
Director, Division of Public Utilities

GARY HERBERT
Governor
SPENCER J. COX
Lieutenant Governor

COMMENTS

To: Public Service Commission of Utah

From: Utah Division of Public Utilities
Chris Parker, Director
Artie Powell, Energy Section Manager
Bob Davis, Utility Analyst

Date: September 15, 2017

Re: **Docket No. 16-035-36**. In the Matter of the Application of Rocky Mountain Power to Implement Programs Authorized by the Sustainable Transportation and Energy Plan Act. Phase Four – Smart Inverter and Microgrid Innovative Utility Programs.

Recommendation

The Division finds the Smart Inverter Program and Microgrid Program in the public interest and recommends the Commission approve both programs. The Division's support for these programs is conditional on the same reporting requirements and treatment of potential Operation, Maintenance, Administrative, and General (OMAG) expenses ordered by the Commission in previous phases of this docket.

Issue

On August 15, 2017, Rocky Mountain Power (Company) filed its fourth tranche of the Sustainable Transportation and Energy Plan (STEP) – Smart Inverter and Microgrid Innovative Utility Programs. The Company requests that both programs become effective on November 1, 2017. The Division offers the following comments in regard to Phase Four of the STEP program.

Discussion

SB 115, Sustainable Transportation and Energy Plan Act, enacted during the 2016 Legislative General Session created a new Utah Code section, Section 54-20-105.[1] The Company filed the Smart Inverter and Microgrid Innovative Programs pursuant to 54-20-105(1)(h) "other technology program." The Company is asking the Commission to approve $450,000 for the Smart Inverter program and $250,000 for the Microgrid program. The Division understands the requested $700,000 is part of the five-year $17,000,000 ($3,400,000 annual) Innovative Utility Programs approved in prior phases of this docket.[2]

Smart Inverter Program

The Company has partnered with Utah State University (USU) and the Electric Power Research Institute (EPRI) to investigate the capabilities of smart inverters and their affects and benefits on the Company's distribution system. This program will review the Company's distributed energy resource (DER) interconnection policies and propose necessary modifications to enable adoption of smart inverters throughout the Company's service territory. Additionally, the Company is participating in the interconnection standards revisions proposed by the Institute of Electrical and Electronics Engineers (IEEE) standard 1547 and Underwriter Laboratory's UL 1741.[3] Research from this program will help the Company gain better knowledge to participate in establishing those standards.

Although the research team will not be specifically studying reliability standards,[4] such as System Average Interruption Frequency Index (SAIFI) or System Average Interruption Duration Index (SAIDI), the program will lead to better understanding of what affects smart inverters will have on grid stability, voltage regulation, and power quality. This research program's main outcome will be to better define optimum settings for smart inverters in a controlled environment versus having smart inverters with varying settings throughout the Company's system. These optimal settings (present and future) will be conveyed to customers and installers mainly through the interconnection process. The Company envisions that it will be the sole responsibility of the customers and installers to maintain smart inverters accordingly. The Company plans to allow the smart inverters to work autonomously until the research team can better understand how to effectively communicate with the inverters and integrate the inverters with other Company assets. The research program will not focus on implications

[1] See https://le.utah.gov/xcode/Title54/Chapter20/54-20-S105.html?v=C54-20-S105_2016051020160510.
[2] Company's Application to Implement Programs Authorized by The Sustainable Transportation and Energy Plan Act, Table 1 STEP Funding Budget, at page 4.
[3] Company Application, Smart Inverter Project, at pages 5-6.
[4] Reliability standards such as – SAIFI, SAIDI, CAIDI, ASAI, CEMI, ASIFI, ASIDI, MAIFI as found in the book by A. Kwasinski, W. Weaver, R.S. Balog, (2016). Microgrids and other Local Area Power and Energy Systems. Pages 39-40. Cambridge. USA.

should the optimal settings be changed accidentally or on purpose. The Division sees communication with installers and customers of these optimal settings as a potential control and consistency problem as the penetration of smart inverters increases. It believes the Company will need to further define how it intends to control this aspect of smart inverters in the future.

The Smart Inverter Program will run approximately one year beginning in 2018. The Company is requesting $450,000 in Step Funds ($100,000 RMP, $250,000 EPRI, and $100,000 USU). The Company will disperse funds to EPRI and USU as requested. Any unused funds will be used to buy tools and research papers that will help the Company implement smart inverter standards. The Company does not expect any additional OMAG expenses as a result of the Smart Inverter program.

Microgrid Program

The Company has partnered with USU and Hill Air Force Base for the Microgrid program. USU is a prime location for the microgrid as it already has some of the required assets in place at its EV test center, which will serve as the foundation for the microgrid program. This will greatly lower the costs to finish constructing the microgrid for this research program. The additional required equipment will not be purchased through a bid-type procurement process as the required equipment will be specific to the equipment already in place. The projected costs of the additional required equipment are included in the requested amount as explained below. Please refer to Exhibit A for a more detailed outline of the proposed microgrid components.[5]

Although the research team will not be studying reliability standards such as those mentioned above, the program researchers will be studying the microgrid's ability to ride through outages and other events at the USU Electric Vehicle and Roadway (USU EVR) test facility (simulated and actual).

Part of the microgrid program will have researchers identifying changes needed to current interconnection policies to allow third-party microgrids to properly interface with the Company's system. Another outcome of the microgrid program will have researchers gaining knowledge on how the microgrid exports energy (as in other distributed generation resources) when not running in isolation (Island Mode). Specifically, the research team will study the ancillary services provided by the microgrid, in particular the battery's ability to reduce demand. The research team will study other attributes of the microgrid as the program proceeds. The Company anticipates a low probability of compatibility issues between the

[5] DPU Data Request 7.22.

microgrid and the rest of the system during the research program. The USU EVR is on an isolated circuit with a single fuse that will clear in the event of a fault problem.

The Microgrid Program will run approximately two and half years beginning in 2018. The equipment will remain as property of USU at the completion of the program, at which time USU will be solely responsible for the maintenance and reliability of the equipment. The Company does not expect any additional OMAG expenses as a result of the Microgrid program. The table below offers a breakdown of the requested $250,000 of STEP funds for the program:[6]

Micro-grid Demonstration Project Costs	
Description	**Cost**
Labor	
USU Graduate Student	$ 42,000
USU Undergraduate Student	$ 13,500
USU Faculty	$ 15,000
USU Indirect Costs	$ 28,500
Travel and Meals (Logan-SLC)	$ 2,000
RMP Engineering	$ 30,000
Materials	
Equipment Supplies and Existing Hardware Improvements	$ 30,000
Additional Controls Hardware	$ 43,000
Supplemental Resource (e.g. additional battery kwh)	$ 46,000
Total	$ 250,000
Project Assumptions	
- Existing USU control systems require only moderate improvements	
- USU solar array will be implemented prior to microgrid implementation	

[6] Company's response to DPU Data Request 7.21. Expanded detail of Company's Target Costs, Application to Implement Innovative Utility Programs, Exhibit B, August 15, 2017, page 6.

The Division recommends the Commission direct the Company to consider how cybersecurity threats might compromise Company and third-party owned microgrids rendering the overall grid vulnerable. Additionally, if smart inverters become commonplace as distributed generation penetration increases, the software settings and protocols should be studied as well to insure system reliability.

The Smart Inverter and Microgrid Programs will help Company personnel gain a better understanding of how smart inverters and microgrids affect and provide benefits to the system including cybersecurity concerns.

The Smart Inverter program will inform stakeholders how to integrate smart inverters into the system in a way to gain the most benefit for system reliability. This includes determining optimal settings, conveying those optimal settings to installers and customers during the interconnection process, and determining a way to communicate updated settings as needed.

Company personnel and stakeholders need to gain a better understanding of a microgrid's impacts on and benefits to the system. Microgrids are likely to multiply in number in the near future. There are many questions to be answered about their usefulness to utility networks. Appropriate regulatory treatment of microgrids must also be explored. This research should help answer many of those questions.

Conclusion

The Division finds both the Smart Inverter and Microgrid Programs in the public interest and recommends the Commission approve both programs. The Division's recommendation of these programs is conditional on the same reporting requirements and treatment of potential OMAG expenses ordered by the Commission in previous phases of this docket.

CC Jeffrey K. Larsen, RMP
Bob Lively, RMP
Michele Beck, OCS