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**MEMORANDUM**

To: Utah Public Service Commission

From: Utah Division of Public Utilities  
Phil Powlick, Director  
Artie Powell, Energy Section Manager  
Jamie Dalton, Utility Analyst II  
Abdinasir Abdulle, Technical Consultant

Date: October 27, 2009.

Re: Docket Number: 08-999-05 In the Matter of the Consideration of the Amendment of Title 16 U.S.C. 2621(d) and the Addition of Title 42 U.S.C. 6344 by the U.S. Energy Independence and Security Act of 2007. Consideration of Smart Grid Investments” and “Smart Grid Information.

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**RECOMMENDATION**

The Division of Public Utilities (Division) recommends that the Public Service Commission (Commission) not adopt the EISA smart grid investments and smart grid information standards. The Division believes that more time is needed to ensure that smart grid technology is mature enough to warrant Company investment and ratepayer support in Utah. Therefore, the Division further recommends that the Commission require the Company to file an annual report that summarizes its work of monitoring smart grid projects throughout the country and actions taken by the Company to evaluate or implement smart grid technology.

## **ISSUE**

The Energy Independence and Security Act of 2007 (EISA) requires that the Utah Public Service Commission (Commission) consider and make a determination to either adopt, modify or not adopt new standards for smart grid investments and smart grid information. This memo addresses the addition to the Public Utility Regulatory Policies Act (PURPA) of 1978 section 111(d) standard (16)(A), (17)(A) and (17)(B). Among other things, these standards require each state to evaluate potential investments in smart grid systems and consider the related benefits, costs, and potential improvements to system reliability, performance, and security. These standards also provide guidelines on information that must be provided to customers with the implementation of smart grid technologies. These standards are listed in Appendix A.

## **BACKGROUND**

On September 8, 2008, the Utah Public Service Commission (“Commission”) issued a notice for a technical conference to be held on November 5, 2008. In this technical conference, the Commission staff explained the Energy Independence and Security Act of 2007 (“EISA”) and the four new electricity standards added to the Public Utility Regulatory Policies Act (“PURPA”) by EISA. In Utah, any standard that the Commission determines as appropriate to adopt would only apply to Rocky Mountain Power (“Company”). Assignments were made during the technical conference to various groups to address the new PURPA standards.

One such group accepted an assignment to evaluate the following two related PURPA standards: “Consideration of Smart Grid Investments” and “Smart Grid Information” (“the standards”). Upon completion of the work group’s evaluation, the Commission requested that the Division file a memo with the Commission containing its recommendation either adopting the standards as stated in the EISA or proposing alternative standards.

The intent was for the Division’s memo to serve as a catalyst for comments from interested parties that the Commission could consider in determining whether to adopt the EISA standards. The Division solicited input from interested parties by circulating a draft of this memo among group members. While the Division has attempted to incorporate those comments into the final

version of this memo, the comments and recommendations herein are solely those of the Division. As such, we encourage others to file comments with the Commission as envisioned by the Commission's process. This memo presents the Division's recommendations regarding the Smart Grid Investments and Smart Grid Information standards.

### **Work Group Meetings and Participants**

There was considerable interest in the topic of smart grid as reflected by attendance at one or more of the smart grid meetings by numerous representatives of businesses, municipalities, private citizens, state agencies, and public interest groups. Among those consistently attending the work group meetings were representatives of the Division, the Office of Consumer Services, the Commission Staff, the Company, and several private citizens.

The group held five meetings on January 21, February 25, May 13, June 16, and July 28, 2009. At the May 13, 2009 meeting, Wayne Shirley, a representative for the Regulatory Assistance Project ("RAP"), facilitated a workshop on smart grid, during which the two smart grid standards were discussed and evaluated.

## **DISCUSSION**

### **Smart Grid**

There is no official industry definition of smart grid. However, according to the Modern Grid Initiative<sup>1</sup>, smart grid has the following characteristics:

1. *"It will enable participation by consumers."* Smart grid enables consumers to have access to new information, control, and options to engage in electricity markets. Consumers will be able to see what they use, when they use it, and what it costs them. This will enable them to manage their energy costs, invest in new devices and sell resources for revenue or environmental stewardship. In addition, grid operators will have new resource options that will enable them to reduce peak load and prices and improve reliability.

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<sup>1</sup> [http://www.netl.doe.gov/moderngrid/docs/SG-Enabling%20the%2021st%20Century%20Economy\\_Pullins\\_2008\\_12\\_02.pdf](http://www.netl.doe.gov/moderngrid/docs/SG-Enabling%20the%2021st%20Century%20Economy_Pullins_2008_12_02.pdf)

2. *“It will accommodate all generation and storage options.”* Smart grid will seamlessly integrate all types and sizes of electrical generation and storage systems. This will move the system from one dominated by central generation to a more decentralized model as more smaller distributed sources and plug-and-play convenience come into the system.
3. *“It will enable new products, services and markets.”* Smart grid will link buyers and sellers, support the creation of new electricity markets, and provide for consistent market operation across regions. That is, instead of the current not well integrated, limited wholesale markets, smart grid will lead to mature, well-integrated wholesale markets and growth of new electricity markets.
4. *“It will provide power quality for the digital economy”* The smart grid will provide utilities with the ability to better monitor, diagnose, and respond to power quality issues thus reducing consumer losses due to power quality.
5. *“It will optimize asset utilization and operate efficiently.”* Smart grid will enhance asset operations by improving load data, reducing system losses, and integrating outage management. It will also improve the maintenance and resource management processes. This will lead to reduced utility costs, both O&M and capital.
6. *“It will anticipate and respond to system disturbances.”* With smart grid, the system will be able to self-heal by performing continuous self-assessment, detecting, analyzing, and responding to any disturbances, and restoring the grid components or network sections.
7. *“It will operate resiliently against attack and natural disaster”* Smart grid enables system-wide solution to physical and cyber security thereby reducing threats and vulnerabilities.

However, these characteristics do not define smart grid, but rather are outcomes of various actions that a utility can take, including investing in primary assets or enabling assets. Primary assets include, but are limited to, demand responses programs, distributed generation, distributed storage, distribution automation, and electric plug-in hybrid vehicles. Smart grid technologies typically incorporate enabling assets, which are technologies that enable many primary assets and applications. These enabling assets include communication networks, smart meters, energy

management systems for homes and buildings, user information interfaces and support tools, and utility back office systems.

In support of this work and at the request of the work group members, Rocky Mountain power provided a summary document entitled “Rocky Mountain Power’s View of Automated Metering and Smart Grids.” This summary document is provided as an attachment to this memo.

### **Consideration of Smart Grid Investments**

The Commission must consider how the implementation of smart grid technologies may affect statutory requirements regarding the provision of electrical services by a public utility. Under these statutes, the Company is required to maintain reasonably priced, safe, adequate, and reliable utility service for all its Utah customers. The Company is also required to provide consistent levels of customer service to its customers. The work group evaluated how the EISA 2007 smart grid investments and information standards are expected to meet these requirements.

As previously indicated, under the EISA, each state needs to consider requiring a utility to demonstrate that it has considered investment in a qualified smart grid system, based on appropriate factors, prior to undertaking investments in non-advanced technologies.

Central to the above requirement are the phrases “qualified smart grid system” and “non-advanced grid technologies.” One definition of a qualified smart grid system is any system capable of engaging in Smart Grid functions or, in other words, achieving one or more of the seven outcomes listed above. Qualified equipment includes appliances and specialized electricity-using equipment such as motors and drivers in industrial or commercial applications. Other equipment includes monitoring and communications equipment on the T&D system, meters, sensors, and control devices integrated with an electric utility system, retail distributor or marketer, software, equipment that allows Smart Grid functions to be coordinated among utilities and regions, integration controls for distributed generation, and plug-in hybrid electric vehicles

(PHEV) devices. Non-advanced grid technologies are not defined and could include many things.<sup>2</sup>

The Commission would formally implement smart grid technologies through a general rate case or a similar proceeding. During such a proceeding, the Commission could consider authorizing the Company to recover from ratepayers any capital, operating expenditure, or other costs relating to the deployment of a qualified smart grid system, including a reasonable rate of return on capital expenditures. In such a proceeding, the Company would document the least, cost least risk resources necessary to provide safe, economic, and reliable services to their customers, which could encompass resources such as advanced metering systems (AMS) and demand response programs. Clearly, the Company would be required to demonstrate that the systems and associated programs are cost effective when compared to alternative resources that might achieve similar benefits.

### **Potential Issues and Concerns**

There are a number of issues and concerns that were raised by the group regarding smart grid implementation. These are outlined as follows.

#### **Lack of Standards and Protocols for the Commission to Implement Smart Grid Technology**

Currently, there are no industry standards and protocols for smart grid technologies. This prevents the Commission from making informed decisions on what types of smart grid technologies should be implemented.

None of the EISA requirements regarding the implementation of smart grid technologies are currently in place. As noted above, the EISA requires electric utilities to provide electricity purchasers information about the prices, usage, projections, and generation sources.

Additionally, purchasers should have access to their own information. Meeting this requirement

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<sup>2</sup>Smart Grid – Utah Wks facilitated discussion.  
<http://www.psc.state.ut.us/utilities/misc/miscindx/0899905indx.html>

would require full deployment of smart grid technologies including interoperability of all components.

In addition to the lack of standards and protocols for the smart technologies, cyber security problems associated with the smart grid deployment have not been resolved. The smart grid will use automated meters, two-way communications, and advanced sensors to improve electricity efficiency and reliability. However, this infrastructure is vulnerable to hackers who may manipulate it to destabilize sections of the distribution or transmission grid, causing large-scale blackouts and economic chaos. The group recognizes, and the Division concurs, that deployment of smart grid needs to be at a measured pace until the cyber security problem is adequately addressed.

There are several smart grid pilot programs and projects in the developmental stage throughout the country. However, there is concern among the group that the Commission lacks sufficient information that would allow it to even effectively implement a pilot program.

Without additional guidance, it would be difficult for the Commission to make a reasonable determination about the prudence of a public utility's proposed acquisition of such resources.

### **Risk of Recovery**

The lack of standards to determine what constitutes smart grid makes smart grid investments risky investments. A utility investing in such a technology bears the burden of proving, through evidence offered in a general rate case, that the investment in smart grid technology is prudent. As such, the utility bears the risk of not being allowed to recover its costs.

Another issue that would put the Company at risk for recovery is the regulatory principle of used and useful. The Company has non-smart technologies with relatively long depreciation life. For example, Company meters have a 26-year depreciation life in Utah. Replacing these units while they are still used and useful would place the Company at risk for failing the prudence review and therefore not recovering its cost.

## **Ratepayer Risks**

According to its proponents, smart grid technologies, when fully implemented, increase the utilization of generation, transmission, and distribution assets, while simultaneously reducing the on-peak consumption of electric energy and encouraging overall reduction of usage by customers. Rate structures that place the recovery of fixed costs in usage charges create a situation where the more a customer benefits most from smart grid technology, the less they pay for it. However, such rate structures can also create a volatile revenue stream and put the utility cost recovery for these systems at risk.

The group believes, and the Division concurs, that until these industry standards and protocols for smart grid technology are made available and adopted, considering this requirement would not be in the best interest of the Company and Utah ratepayers.

## **CONCLUSION**

While the Division supports the continued pursuit of smart grid technologies, it is concerned that formal adoption of the EISA standard is premature. The group concluded, and the Division concurs, that smart grid technology is not currently mature enough to warrant Rocky Mountain Power investment and ratepayer support in Utah. As appropriate standards and protocols have yet to be developed and adopted, and since there is a lack of sufficient information demonstrating the cost-effectiveness of smart grid technologies, the Division believes it is premature to ask ratepayers to assume the costs and risks of smart grid. Therefore, the Division concludes that moving forward with smart grid investments at this time is not in the best interest of the Company or its customers.

The Division recommends that the Commission direct the Company to follow and evaluate the smart grid pilot programs and projects in the developmental stage throughout the country to gain more useful knowledge and experience and to file an annual report that summarizes its work of monitoring these projects and actions taken by the Company to evaluate or implement smart grid technology

## **APPENDIX A.**

### **PURPA 111(d) Standard (16)**

#### **CONSIDERATION OF SMART GRID INVESTMENTS.**

(A) IN GENERAL.—Each State shall consider requiring that, prior to undertaking investments in nonadvanced grid technologies, an electric utility of the State demonstrate to the State that the electric utility considered an investment in a qualified smart grid system based on appropriate factors, including—

- (i) total costs;
- (ii) cost-effectiveness;
- (iii) improved reliability;
- (iv) security;
- (v) system performance; and
- (vi) societal benefit.

### **PURPA 111(d) Standard (17)**

#### **SMART GRID INFORMATION.**

(A) STANDARD.—All electricity purchasers shall be provided direct access, in written or electronic machine-readable form as appropriate, to information from their electricity provider as provided in subparagraph (B).

(B) INFORMATION.—Information provided under this section, to the extent practicable, shall include:

- (i) PRICES.—Purchasers and other interested persons shall be provided with information on—
  - (I) time-based electricity prices in the wholesale electricity market; and
  - (II) time-based electricity retail prices or rates that are available to the purchasers.
- (ii) USAGE.—Purchasers shall be provided with the number of electricity units, expressed in kwh, purchased by them.
- (iii) INTERVALS AND PROJECTIONS.—Updates of information on prices and usage shall be offered on not less than a daily basis, shall include hourly price and use information, where available, and shall include a day-ahead projection of such price information to the extent available.
- (iv) SOURCES.—Purchasers and other interested persons shall be provided annually with written information on the sources of the power provided by the utility, to the extent it can be determined, by type of generation, including greenhouse gas

emissions associated with each type of generation, for intervals during which such information is available on a cost-effective basis.