BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

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ORIGINAL

IN THE MATTER OF THE COMMISSION'S INQUIRY INTO POTENTIAL IMPACTS TO THE CURRENT UTILITY MODEL RESULTING FROM INNOVATION AND TECHNOLOGICAL DEVELOPEMENTS IN GENERATION AND DELIVERY OF ENERGY.	**DOCKET NO. E-00000J-13-0375** **COMMENTS OF ARIZONA STATE UNIVERSITY'S UTILITY OF THE FUTURE CENTER**

The Utility of the Future Center (UFC) at Arizona State University (ASU) respectfully submits these comments in response to Commissioner Bob Burns' letter dated December 5, 2013.

About the Utility of the Future Center

The UFC is part of ASU's Sandra Day O'Connor College of Law and operates as a hub of utility innovation and thought leadership, pooling from a variety of leading edge researchers, thinkers, industry leaders, and policy experts. The Center and its partners share a vision of advancing a clean energy future, higher education, and workforce development with the U.S. electric utility sector and advancing new partnerships between the utility industry and the university sector to advance new utility business models, regulatory paradigms, and methods for enabling distributed generation and energy efficiency.

Overview of Comments

The purpose of these comments is to: 1) provide general feedback on the proposed scope of this docket from the broader ASU community, 2) identify individuals at ASU with expertise that could aid the Commission's inquiry, and 3) highlight ongoing activities within the UFC that could also be useful to this Commission's inquiry.

1. Feedback on proposed scope of the docket from ASU

Over the last few weeks UFC has consulted with over 40 members of the ASU community on the scope of this docket and workshops proposed in Commissioner Burns'

letter. Among these individuals were members of ASU faculty and staff that are experts on the six subject matters outlined in the letter. The following represents some general observations and suggestions collected from these individuals.

As part of the proposed workshops, we encourage the Commission to set aside time for discussion of some overarching questions that relate to each of the individual technology areas. For instance:

- What are the public benefits of electrification and can these be achieved through different sets of technologies or regulatory arrangements?
- If new energy technologies generate new benefits, or impose new costs, for society, who should pay for these costs (or be compensated for these benefits)?
- How should the Commission account for the uncertainties inherent in future technological changes? These uncertainties might include the emergence of new technologies, changes in technology costs, changes in fuel prices, and risks associated with project development.
- If technological changes lead to stranded assets, who should pay for the costs of these assets?
- To what extent do incumbent utilities need to be providers of the technologies identified?
- How do current rules and regulations incentivize, or disincentivize, incumbent utilities to innovate? And how do these rules and regulations influence other potential providers of energy products and services?
- How could the regulatory structure be improved upon to encourage investments in new technologies that benefit ratepayers and society as a whole?
- Are there other jurisdictions that have had successful examples of regulatory paradigms that spur innovation and efficiency? What has been tried and what has not?
- Since the providers of new technologies may not even exist yet, and cannot represent themselves, how can we ensure that the regulatory process appropriately values innovation?
- To what extent can institutional innovations such as markets help automate the Transmission and Distribution system and play a role in delivering benefits to customers and society?

Other more specific areas for workshop investigation could include the following:

- Improved short-term forecasting of loads and renewable resource availability can facilitate higher penetration of renewable power and decrease spinning reserve costs (for the utility) and decrease demand charges (for the consumer). This topic could be discussed in Item 2.
- Improved short-term forecasting is also important in micro-grids that run diesel generators, often at a low load to provide operating reserve. Improving understanding of short-term dynamics allows a micro-grid to reduce required operating reserve and, at times, shut of generators and depend on batteries for reserve. This topic could be discussed as part of Item 6.

- Thermal energy storage has multiple applications throughout the Valley. Improved control strategies of chillers and TES can reduce operating expenses for existing equipment, and experimental analysis of new chiller-storage systems shows areas for hardware innovation. Further, the investigation of TES at the residential-scale shows promise for reducing summer peak load caused in large part by household air conditioning units. Innovation in hardware and software is needed to unlock this potential. The topic could be discussed as part of Item 1 or 2.
- The effect of high temperature climates on battery performance and lifetime should be reflected in the discussions occurring in Item 3.
- Adaptive building energy management systems with control settings to a) minimize cost, and b) minimize carbon can have wide application across a market with different performance metrics set by different consumers. Topic for discussion in Item 2 or 6.
- Integrated resource planning, or phased additions in capacity and storage, could be discussed in Item 1 or 6 to create roadmaps for how generation, storage, and T&D may need to change over time to meet rapid population growth.

More generally, we are in agreement with the subject areas chosen by the Commission. We would encourage the Commission to carve out ample time during the discussion of each of the subject areas to address the business model and regulatory changes that will be needed to facilitate and accommodate the rapid changes occurring in each of these areas today. Commissioner Burns has identified this as an area of investigation for each topic, which we applaud and recommend that it receive a significant amount of attention during the workshops.

2. ASU's expertise in proposed subject areas

In discussing this docket with the ASU community, there was a great deal of interest in the proposed topics. Many believe the focus on technology and innovation is aligned with ASU's broader mission to help Arizona become a leader in energy research and development. The table below shows ASU faculty and staff that have volunteered to provide their expertise if the Commission requests it. While these individuals volunteered themselves, ASU has many other experts in each of the six technology areas that Commissioner Burns mentioned in his letter and the UFC would be happy to work with the Commission to identify additional experts as needed.

Name	Title	Areas of Expertise	Contact Information
Dr. Sayfe Kiaei	Professor, School of Electrical, Computer and Energy Engineering	• Sensors and Metering Technologies; • System level issues and optimization of PV systems; • Integrated Power Electronics, future PV system integration	sayfe@asu.edu

Dr. Clark Miller	Associate Professor, Department of Political Science, College of Liberal Arts and Sciences	• Science and Technology Policy, • Governance of Emerging Technologies	Clark.Miller@asu.edu
Kris Mayes, JD	Professor of Practice, Sandra Day O'Connor College of Law; Director, Utility of the Future Center	• Utility law and regulation • Renewable energy and energy efficiency policy	Kris.Mayes@asu.edu
Edward Burgess, MS, PSM	Program Coordinator, Utility of the Future Center	• Solar engineering • Distributed energy resources • Transmission system planning	Edward.Burgess@asu.edu
Dr. Harvey Bryan	Professor, School of Architecture and Landscape Architecture	• Home energy management systems • Demand response • Energy efficiency	Harvey.Bryan@asu.edu
Dr. Elisabeth Graffy	Professor of Practice, Center for Science and Policy Outcomes	• Public sector institutions • Strategic management of the science-policy interface • Public engagement • Economics	Elisabeth.Graffy@asu.edu
Dr. Mike Pasqualetti	Professor, School of Geographical Sciences and Urban Planning	• Physical security of energy infrastructure • Security implications of energy resources	pasqualetti@asu.edu
Dr. Nathan Johnson	Assistant Professor, Engineering and Computer Systems	• Energy system modeling and optimization • Microgrids	nathanjohnson@asu.edu
Dr. Ben Ruddell	Assistant Professor, Engineering, College of Technology and Innovation	• Thermal Energy Storage	bruddell@asu.edu

3. UFC activities related to this inquiry

The UFC is encouraged by the proposed scope of the docket. We believe the spirit of this inquiry is closely aligned with the UFC's mission and offer our assistance to ensure that the outcome is productive. In this regard, we want to alert the Commission that the UFC has several projects under way that may be valuable to the Commission's inquiry. One project in particular is both relevant and timely; that is, the UFC is part of a consulting team currently under contract to the Western Interstate Energy Board's (WIEB) State and Provincial Steering Committee (SPSC) to conduct research for a project titled "Exploring New Regulatory Models." This project is being conducted in two phases. Phase 1 will focus on regulatory actions being taken to address the growth and impacts of distributed energy resources and other technologies that potentially affect utility earnings, and a

review of performance regulation measures that may help to address issues that arise from these emerging technologies. Phase 1 would review current literature and lessons already learned and to set a direction for further investigation in Phase 2. We think this effort may provide the Commission with valuable information regarding possible regulatory strategies for fostering innovation and competition. A final Phase 1 report will be presented at the next SPSC meeting, which is scheduled to take place in Tempe, AZ in late March.[1]

ASU very much appreciates the effort being undertaken in this docket and we believe it places the Commission in a leadership role nationally on utility of the future issues. We look forward to assisting the Commission as it moves forward with its analysis.

Respectfully submitted by this Friday, January 17, 2014 by:

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[1] See for details: http://www.westgov.org/wieb/site/crepcpage/crepupco.htm