Federal Energy Regulatory Commission – National Association of Regulatory Utility Commissioners
Collaborative on Smart Response
NARUC Annual Meeting
Sunday, November 14, 2010

FERC Technical Conference
on
Smart Grid Interoperability Standards
Docket No. RM11-2-000

Written Testimony of
George Bjelovuk
Managing Director – Enterprise Technology
American Electric Power
and
Governing Board Secretary of the
NIST Smart Grid Interoperability Panel

Good morning, Co-chair Wellinghoff, Co-chair Norris, Co-chair Isiogu, and Co-chair Reha, and associated commissioners and staff. My name is George Bjelovuk, managing director of enterprise technology for American Electric Power. I also serve as the secretary of the Governing Board of the National Institute of Standards and Technology's (NIST) Smart Grid Interoperability Panel (SGIP).

I want to thank FERC for convening this technical conference on smart grid interoperability standards and for the opportunity to provide these remarks.

NIST, the SGIP, and the Process Going Forward

When Congress enacted the Energy Independence and Security Act in 2007, it directed NIST to coordinate the development of a framework, standards and protocols for information to achieve interoperability of smart grid devices and systems. It called for the framework to accommodate traditional generation and distribution resources, while facilitating the adoption of emerging energy technologies including demand response, distributed generation, energy storage and electric vehicles.

From the onset, NIST recognized several opportunities to accelerate progress toward its mission. NIST facilitated a series of public workshops, in conjunction with the GridWise Architecture Council, and collected input from a broad range of contributors including the utility industry, vendors, researchers, economists, academia and other interested stakeholders. NIST initially organized these dialogues across Domain Expert Working Groups (DEWGs) in an effort to drive prioritization of activities across specific electric consumer segments – residences, buildings, and Industry – as well as identify potential public policy opportunities to promote the smart grid. As interest in the NIST activities gained momentum, NIST enlisted the support of the Electric Power Research Institute (EPRI) to create and facilitate a process where applicable standards, and standards gaps, critical to the success of the smart grid could be identified. EPRI facilitated two multi-day workshops with as many as 700 participants from a diverse base of stakeholders.

Those efforts yielded the "Conceptual Model" referenced in many smart grid standards dialogues, and ultimately resulted in the publication of the NIST Framework and Roadmap for Smart Grid Interoperability Standards, Release 1.0. The document identified 75 potential standards, nearly 50 of which were candidates for further consideration.

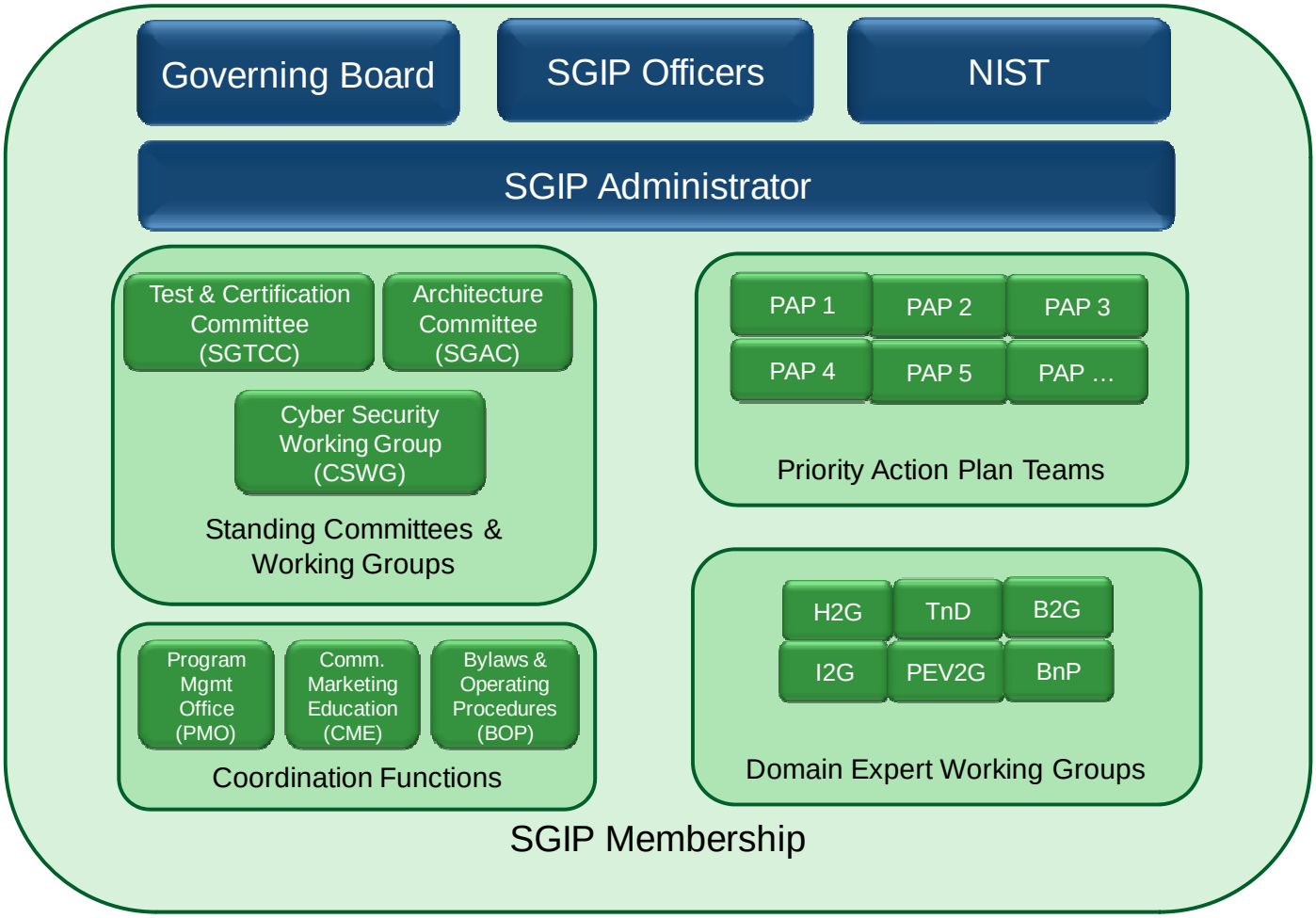
NIST also recognized the key role cyber security will play in the deployment of the smart grid and formed the Cyber Security Coordination Task Group (CSCTG) in an effort to consolidate several initiatives underway directed at making recommendations for securing the smart grid. Many months of effort, and the contributions of some 350 experts, resulted in the publication of NIST's Smart Grid Cyber Security Strategy and Requirements. The document serves as a reference for the definition of devices and systems to be secured, and classifies them according to the level of impact to utility operations resulting from a security breach.

In an effort to further structure these activities, NIST created the Smart Grid Interoperability Panel (SGIP). The SGIP is a membership organization open to all stakeholders in the smart grids

standards community. Member organizations declare an affiliation with one of twenty-two stakeholder categories, representing a broad range of participants in the standards discourse, from manufacturers, and industry consortia to municipal, rural, and investor-owned utilities. Currently, the SGIP consists of over 1,700 individuals from over 600 organizations.

The SGIP encompassed all the work in progress, providing a structure for coordination of smart grid standards development going forward. In was recognized that some activities would be foundational to the work of the SGIP, and these efforts were organized into Standing Committees and Working Groups. Three such groups of activities were determined to be important from the onset – the Cyber Security Working Group (CSWG), the Smart Grid Architecture Committee (SGAC), and the Testing & Certification Committee (SGTCC).

The diagram below describes the major organizational components of the SGIP:



The SGTCC was established in recognition of the need for existing and emergent participants in the smart grid ecosystem to interoperate, and certify their ability to do so through conformance testing and certification. Just last week, the SGTCC announced it had developed a plan, and presented it to the SGIP. The plan has three major components – an interoperability test assessment tool, agreements for the use of recognized industry standards for testing agency and certification body qualification, and an Interoperability Process Reference Manual (IPRM). The document provides key criteria and recommendations for testing and certification authorities. This major milestone was accomplished in six months of deliberations and included a broad range of stakeholders.

Beyond the three key standing committees and working groups, three coordinating functions have been established – A Bylaws and Operating Procedures committee, a Program Management Office (PMO), and the Communications, Marketing and Education committee. The original DEWGs were incorporated, and expanded to include Transmission & Distribution and Electric Vehicle-to-grid opportunities.

Through the various interactions of the standing committees, coordination functions and DEWGs, standards gaps are identified and presented to the Governing Board. Upon adoption by the Governing Board, Priority Action Plans (PAPs) are commissioned, and participation solicited from the SGIP membership at large to identify key activities and Standards Development Organization coordination required to resolve the standards need. The PMO provides a structure to the PAPs, and reports progress to the Governing Board on a regular basis.

The SGIP is a consensus-based organization and places high value on open consideration of all legitimate views and proposals. As standards are developed, and achieve “sufficient consensus”, NIST will submit them via a Letter of Notification to FERC for consideration by regulators. The first five such standards have been identified, and provided to FERC for consideration.

A Utility Perspective on Smart Grid Standards

As the electric industry in the United States became more interconnected, interoperability and "smart" systems within the bulk power network naturally evolved. One such evolution was related to the use of the Inter-Control Center Communications Protocol (ICCP), represented by IEC 60870-6, one of the five standards identified by NIST and presented to FERC. This evolution occurred over many years and refinement of requirements by control center operators. Today's transmission operators communicate with one another using standards and protocols designed to maintain bulk power grid stability and reliability, and NIST's inclusion of the IEC standards for control center interoperability is consistent with this existing practice. As systems and technologies become generally available and cost effective, the bulk power system will become even "smarter" with the advent of Phasor Measurements Units and Wide Area Visualization, defining opportunities for the expansion of existing data models.

Traditionally, the distribution systems in the United States have had limited need to interoperate. The design of these systems was driven by factors such as local load density, area planning requirements, and the maturity of distribution technology at the time of deployment. Technologies and equipment deployed had long life expectancy, some as long as 30 years. The primary point of interoperability was the standard delivery voltage provided to consumers and the equipment standards for electrical distribution within consumer's homes, businesses and industry.

AEP's ***gridSMART***® initiative is the umbrella under which, like many utilities, it is introducing new energy efficiency and demand response programs to consumers, deploying new technologies in its distribution businesses, and demonstrating future technologies such as battery storage and electric vehicles. The initiative expects to give customers greater control over their energy consumption, and bring new operational capabilities to AEP's distribution systems,

ultimately resulting in improved reliability. AEP has four deployments underway across its 11-state territory.

Its Indiana Michigan Power operating unit completed a 10,000 meter pilot project in 2008 in South Bend, Indiana. The project included smart meters, distribution automation and Volt-VAR control systems, a customer web portal displaying 15-minute interval data up-to-previous day, and two-tiered, two-season tariffs. We also began the field testing of programmable communicating thermostats as a demand response technology. The pilot has been in evaluation for nearly a year, and will culminate in a report to the Indiana Public Utilities Commission in 2011.

In Texas, AEP operates as a Transmission & Distribution Service Provider (TDSP) in the ERCOT electricity market. AEP Texas is deploying nearly one million meters consistent with the Texas legislature's functional requirements for "advanced metering systems" (AMS) over the next four years under a Public Utilities Commission of Texas-approved project. Once completed, the technology will enable Retail Electric Providers (REPs) to innovate around electricity pricing and consumer technologies.

The ARRA enabled two additional projects to be initiated by AEP. In Oklahoma, the State used ARRA funds to create a revolving loan program to enable energy efficient technologies. Our Public Service Oklahoma operating unit was selected as a recipient, and will deploy 15,000 smart meters, advanced distribution technologies, and increased penetration of in-home displays for usage monitoring to demonstrate the conservation effects from energy consumption monitoring by consumers.

Our AEP Ohio operating unit was selected by the DOE for $75 million in Smart Grid Demonstration Project funding to compliment a Public Utilities Commission of Ohio-approved 110,000 meter deployment. Beyond smart meters, the project will include home area networks and grid-friendly appliances, a full suite of distribution management technologies, advanced technologies

such as distributed energy storage and plug-in electric vehicles, enhanced time-of-use tariffs, and a field trial of real-time pricing. AEP has partnered with Battelle Energy to evaluate the 42-month project.

As utilities deploy smart grid systems, they must select standards and information models that are available, broadly adopted by their suppliers, and minimize cost of deployment. As standards development progresses, care must be taken to ensure that the standards can be practically applied to projects, which, in many cases, will remain in operation for many years. Standards development and adoption must not stifle innovation and creativity in the marketplace, and coexistence among technologies will be a requirement. Flexible standards should allow the marketplace to drive the most cost effective way to adopt them, and standards adoption that drives costs up should be avoided.

As the ecosystem of consumer products emerges, consistency among their application to utility smart grid systems will be critical. Gaps in these customer facing standards should be prioritized to support the deployments already underway. As standards and interoperability become more prevalent upstream in the distribution system, cost reductions from competition among suppliers of standard components and systems will occur over many years, ultimately benefitting utility consumers. Finally, NIST's release of the IEC's Common Information Model as one of the first five standards to be considered by regulators validates standards and protocols that are among the most mature in the industry, and are the foundation of many current smart grid deployments, including those at American Electric Power.

AEP is an active participant and supporter of the NIST standards development process, and encourages utilities and industry stakeholders to more broadly engage in the process. AEP is also an active member of the Edison Electric Institute (EEI), and has supported EEI's responses to DOE and FERC on a variety of smart grid-related subjects.

Considerations for Regulators

The priorities for standards development directly relate to consumer technologies and their interface to distribution systems, businesses regulated by State utility commissions. As the NIST process for standards matures, consistency of application across the states will be important on a number of dimensions. For large, multi-state utility operations like American Electric Power, complying with differing smart grid standards on a jurisdictional basis will cause greater complexity in systems and higher costs for consumers. This consistency will particularly be important for consumers moving among utilities, or for businesses with multi-utility relationships.

It should be recognized that deployments underway, reviewed and approved by State commissions, may be deploying technologies compliant with the current state-of-the-art related to standards and protocols. Emerging technologies and new standards and protocols may result in future deployments based on different standards and protocols, and co-existence through the duration of the original investments will be necessary. Approved recovery models for these early deployments should be grandfathered. Moreover, standards development should support innovation in the marketplace. Linking recovery to specific technologies could stifle creativity and innovation, and should be avoided where possible. While new consumer markets may emerge, prioritized standards development should be focused on currently required technical interoperability, not market re-design.

As the telephone system became digital 30 years ago, dialed number information and caller identification became part of the information managed by telephone carriers. Rules emerged that governed the use of this information and protected consumers. As smart grid systems create consumer energy usage information, similar consumer protection rules will be required. Much like the telephone companies used dialed number information to optimize their physical networks, the electric utilities of the future will use new information to optimize the performance of electric

distribution systems, ultimately improving service to consumers. Rules governing information use beyond these operational applications will be required, especially as third party uses for this energy information become apparent. Consumers should be availed the ability to direct the disclosure of this information beyond the operational use of the electric utility.

Wireless telephone service provides an example of coexistence of technologies and standards. Consider the abundance of offerings in the marketplace today within the wireless telecommunications market, operating on a wide variety of technologies – 2G, 3G, CDMA, GSM, and LTE. While the marketplace has driven innovation among participants, consumers have enjoyed an "interoperable" experience across service providers without a standards compliance requirement. A common consumer interaction across smart grid deployments will similarly be an important part of market adoption of smart grid technologies, and consumer engagement will likely be the most difficult challenge to smart grid adoption.

Finally, while cyber security of smart grid components is paramount to maintain the integrity of the electric system, the exchange of threat vector and vulnerability information among smart grid operators will be required. The DOE has funded several such studies and evaluations, and regulatory support for research and pilot projects in these areas is warranted.

* * * * *

Thank you for the opportunity to present these written remarks, and for the opportunity to participate in this important regulatory proceeding. I look forward to working with the FERC-NARUC Committee on Smart Response as it considers the regulatory implications of technical standards for smart grid systems in the United States.

George Bjelovuk

George Bjelovuk

Managing Director
Enterprise Technology

George Bjelovuk was named managing director, Enterprise Technology, in July of 2010. He is responsible for AEP's strategy for technology investments, business information management, and enterprise architecture and standards.

Prior to his current role, Bjelovuk was managing director, Marketing, Research, and Program Development, and was responsible for developing and marketing programs for emerging customer offerings in AEP's utility business and for providing oversight to the company's research & development efforts. He led AEP's gridSMART initiative since its inception in 2007, a program of technology investments and customer programs directed at modernizing AEP's distribution business.

Bjelovuk has been with AEP for 26 years, and has held a variety of leadership positions. As managing director, IT Customer Support Services, Bjelovuk had responsibility for managing the end-user computing environment for AEP's 20,000 employees, including the company's fleet of workstations, mobile data terminals, and distributed computing resources across the firm's 11-state service territory. He also managed operations and project execution on AEP's fiberoptic, microwave, and two-way radio and data networks.

He held the position of Call Center Director, where he was responsible for AEP's Call Center operations, and led the firm's entry into centralized customer telephone transaction processing. He has also held positions of AEP Ohio Customer Services Director, Columbus Southern Power Energy Services Manager, and a variety of Marketing and Customer Services positions at Ohio Power.

Bjelovuk holds a bachelor's of engineering degree in electrical engineering from Youngstown State University, and a master's of business administration from the Fisher College of Business at The Ohio State University.

Bjelovuk was elected to the Governing Board of the National Institute of Standards and Technology's Smart Grid Interoperability Panel. He chairs EPRI's Smart Grid Executive Committee, and is the utility chair for its Intelligrid Program. He is AEP's representative to the Gridwise Alliance and represents the firm in a variety of industry associations.

He also serves as board member for the Simon Kenton Council of the Boy Scouts of America, and has been board member and past president of the Association of Telecommunications Professionals.

Contact: George Bjelovuk, Managing Director – Enterprise Technology
American Electric Power
1 Riverside Plaza
Columbus, OH 43215
(614) 716-3740
gbjelovuk@aep.com