



**U.S. Department of Energy  
Electricity Advisory Committee Meeting  
NRECA Conference Center  
Arlington, VA  
March 27, 2015**

**Summary of Meeting**

## PARTICIPANTS

### **EAC:**

AKE ALMGREN  
Orkas Energy Endurance

WILLIAM BALL  
Southern Company

ANJAN BOSE  
Washington State University

MERWIN BROWN  
California Institute for Energy & Environment

PAUL CENTOLELLA  
Analysis Group

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Regulatory Assistance Project

CLARK GELLINGS  
Electric Power Research Institute (EPRI)

PAUL HUDSON  
Stratus Energy Group

MARK LAUBY  
National Rural Electric Cooperative Association

GRANGER MORGAN  
Carnegie Mellon, Engineering & Public Policy

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Washington State House of Representatives

TIMOTHY MOUNT  
Cornell University

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WANDA REDER  
S&C Electric Company; IEEE

PAUL ROBERTI  
Rhode Island Public Utilities Commission

HEATHER SANDERS  
California Independent System Operator

CHRIS SHELTON  
AES Energy Storage

PAM SILBERSTEIN  
National Rural Electric Cooperative Association

RAMTEEN SIOSHANSI  
Ohio State University

ROY THILLY  
Retired – NERC Board of Trustees

DAVID TILL  
Tennessee Valley Authority

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Independent System Operator of New England

AUDREY ZIBELMAN  
New York Public Service Commission

CARL ZICHELLA  
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**DOE:**

HONORABLE PATRICIA HOFFMAN  
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CAITLIN CALLAGHAN  
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JOSEPH PALADINO  
Department of Energy

MATT ROSENBAUM  
Department of Energy

KAREN WAYLAND  
Department of Energy

**Speakers, Guests and Members of the Public:**

KAREN LEFKOWITZ  
Pepco

CRAIG MILLER  
National Rural Electric Cooperation Association

JAY OLIVER  
Duke Energy

VICKIE VANZANDT  
VanZandt Electric Transmission Consulting, Inc.

DAVID WADE  
Electric Power Board Chattanooga

**ICF/Support:**

THY NGUYEN  
ICF International

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ANDREA WAGNER  
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**Update on the DOE Quadrennial Energy Review**

Ms. Karen Wayland, Deputy Director for State and Local Cooperation, DOE Office of Office of Energy Policy and Systems Analysis (EPSA), presented on the DOE Quadrennial Energy Review (QER). She noted that the DOE version of the QER was delivered in January 2015 and will be released after the completion of the interagency process, which is expected to take place within the next few weeks. Ms. Wayland confirmed that the QER received comments from various agencies during the review process. The QER looks at transmission storage and distribution and is divided up by analysis by sector (e.g., liquid field, natural gas). Ms. Wayland compared the QER to the Quadrennial Technology Review (QTR), which is organized by themes rather than sectors. She noted the grid of the future is the only theme that looks at one specific sector. Several papers will be released and all papers and proceedings will be made available to the public on the website. The QER and the QTR will work in parallel, but Ms. Wayland stated the QER focuses on the institutional regulatory and business model structures of the changes in the electricity sector. She noted that the recommendations focus on research and development (R&D) through the support of cross-cutting initiatives focused on grid modernization.

Ms. Wayland confirmed that the QER work is reflected in the FY16 budget request. She reviewed

other items in the FY16 budget request, which included aid to states that help to regulate and manage systems, support for state energy insurance plans, and emergency planning. The budget request also includes the creation of a program for state electricity reliability that is designed to give preference to plans that highlight the cooperation within the states and with neighboring states that are concerned with building a transmission system that keeps electricity affordable.

Ms. Wayland highlighted the theme of shared transportation and the infrastructure where multiple commodities (i.e., not just energy) move (e.g., roads, ports). She noted that the key questions look at effects on security and economy. The change in production demonstrates the need for the strategic petroleum reserve to deliver oil out of the domestic market. Ms. Wayland noted the QTR includes recommendations on how to deliver the strategic petroleum reserve into the market.

Mr. Zichella commented on the lack of climate in Ms. Wayland's overview. Ms. Wayland explained that the grid should be viewed as an enabler for the President's climate goals. DOE's modeling was completed under a variety of scenarios (e.g., high and low efficiency, carbon target policy, power plant retirements) and combined to see what the future could look like. She highlighted the regional differences that occurred based on specific scenarios. Mr. Zichella asked whether the strategic petroleum reserve was looked at, given the interest in climate. Ms. Wayland confirmed that regional fuel resiliency was studied under emergency situations.

Mr. Van Welie commented on the pipeline study. He explained that the study left out the fact that most of the current pipeline capacity was built under a vertically integrated utility structure. As a result, the challenge that emerged was that in a restructured environment the merchant generators typically will not sign to build this pipeline. He asked if the QER would highlight this problem. Ms. Wayland confirmed the QER includes information on the situation in New England. DOE began thinking about the changing nature of storage when a price differential is used to drive investments in storage.

### **EAC Smart Grid Subcommittee Activities and Plans**

Ms. Reder introduced the Smart Grid subcommittee activities and plans including the R&D paper (requesting EAC approval at the March 2015 meeting), the national strategy for distributed energy storage (to be completed in 2015), and the ARRA work product (preliminary draft in June 2015 and final deliverable in fall 2015).

#### ***Research and Development paper***

Mr. Gellings discussed the Smart Grid R&D needs paper. The R&D paper started four years ago when the EAC decided to elucidate to DOE the R&D needs surrounding technology. EAC conducted a survey that received input from nearly all EAC members.

Mr. Gellings presented the survey results related to the identification of priority areas for DOE's efforts in Smart Grid R&D. The Committee discussed the share of DOE funds that could be allocated according to technology readiness. The EAC survey results indicated some degree of agreement around the need for federal R&D in the area of distribution automation.

Mr. Gellings conveyed the recommendations of the R&D paper related to convening interactive sessions involving stakeholders to discuss options, paths, and potential collaborative programs.

Mr. Gellings motioned for the R&D paper to be approved by the EAC and the Smart Grid R&D paper was adopted unanimously.

### ***Distributed Storage Paper***

Mr. Carlos Coe provided an update on the distributed storage (DES) paper and the Smart Grid and Energy Storage subcommittee's joint effort. The scope of the DES work product includes markets, regulatory and interconnects, technology and applications, and benefits and has the intended purpose of identifying gaps and providing recommendations to DOE.

Mr. Coe noted that market projections are expected to increase over the next 5-10 years. Mr. Coe reviewed the DES expert interviews and the information captured by the interviews. Mr. Coe mentioned that electric vehicles and thermal storage were not covered in the expert interviews. He highlighted observations and recommendations from the DES interviews and outlined the plan for completion of the paper by September 2015.

### ***ARRA Projects paper***

Ms. Reder provided a status update on the ARRA Projects paper. She noted that the paper will describe lessons related to technology, policy, economics, and institutions. Ms. Reder provided overviews of the work needed around capacity building, technology performance improvements, business case development, systems integration, standards and policies.

Ms. Reder stated that a draft of the work plan outline has been completed. She noted the DOE ARRA project reports are commencing with the draft preliminary recommendations due in June 2015, around the same time the second ARRA EAC panel will be formed. The final recommendations will be established in summer 2015 with a target completion date of fall 2015.

### **EAC Member Discussion of Smart Grid Subcommittee Plans**

Ms. Reder thanked the Smart Grid Subcommittee speakers and invited EAC members to ask questions.

Mr. Bose commented that the R&D paper includes more information than just the EAC survey results. Mr. Gellings assured the presentation was an overview and confirmed the paper includes additional information and findings. Mr. Bose asked how the R&D paper fits into the national laboratory update. Mr. Cowart explained additional alignment will need to occur, but confirmed that this is an effort to get priorities on the agenda. Ms. Reder commented that the EAC survey was a valuable addition and suggested using this tool in the future for other EAC work products.

The Committee discussed the extent of inclusion of thermal storage and electric vehicles in the distributed energy storage work product and the scope of the paper more broadly. Mr. Coe noted

that the appendices allow the group to provide initial thoughts on areas that could form the basis for future work products.

### **ARRA-Supported Smart Grid Deployment Efforts Panel**

Mr. Hank Kenchington, Deputy Assistant Secretary for Advanced Grid Integration, DOE OE, introduced the ARRA panelists including: David Wade, EPB Chattanooga; Craig Miller, National Rural Electric Cooperative Association (NRECA), Vickie VanZandt, VanZandt Electric Transmission Consulting, Inc.; and Karen Lefkowitz, Pepco.

Mr. David Wade, Executive Vice President and COO, Electric Power Board (EPB) Chattanooga, presented on Chattanooga, Tennessee's Smart(er) Grid. He introduced EPB's programs and the power grid that has been showing value to the residents of Chattanooga. Mr. Wade discussed how the EPB fiber optics network and distribution automation systems with intelligence switches have been able to significantly reduce outage durations and improve response time. Mr. Wade expanded on advanced metering infrastructure (AMI) technologies that allow for customer data collection, which allows EPB to better serve customers. Mr. Wade concluded with a visual demonstration of the innovative technologies that allow for EPB to quickly detect outages.

Mr. Craig Miller, Chief Scientist, NRECA, discussed the roles and responsibilities of the NRECA. Mr. Miller expanded on projects pertaining to smart meter switches and advanced meter data management systems that the NRECA undertook after receiving funding from the DOE. Mr. Miller discussed how the support from DOE was fundamental for the success of NRECA. The support from DOE illuminated where NRECA needs to further conduct research with distributed generation, agile control, communications, analytics, data, cybersecurity, and architecture. Mr. Miller concluded that their efforts to improve the future of the grid would not be possible without the ARRA grant.

Ms. Vickie VanZandt, Founder, VanZandt Electric Transmission Consulting, Inc. provided an overview of the modernization of the U.S. electric grid and the Smart Grid Investment Program (SGIG). Ms. VanZandt began by explaining the changes and increasing complexity in the system operating environment. Ms. VanZandt expanded on needs in today's operating environment to achieve better modeling and results, especially during stochastic events. For example Ms. VanZandt explained that achieving more frequent and synchronized measurements will be critical. She elaborated on the successes of the Western Interconnection Synchrophasor Program (WISP). Ms. VanZandt summarized steps moving forward, such as improving the detection of bad data and continuing to enhance the validity of modeling.

Ms. Karen Lefkowitz, Vice President, Chief Information Security Officer, Pepco, discussed Pepco's Smart Grid deployment efforts. Ms. Lefkowitz began with a discussion of the integrated communications infrastructure and domains. Ms. Lefkowitz explained that the Smart Grid technology is meeting expectations in its design and execution especially with respect to the technologies' ability to detect outages to enable rapid service restoration. Ms. Lefkowitz stated that usage data is available to customers and that Pepco is now focused on facilitating new uses of that data by the customer.

## **EAC Member Discussion of ARRA-Supported Smart Grid Deployment Efforts**

Mr. Kenchington thanked the ARRA-Supported Smart Grid Deployment Efforts speakers and invited EAC members to ask questions.

Ms. Reder asked Mr. Wade how the importance and implications of interacting with customers drives the EPB to improve. Mr. Wade discussed the outcome of holding focus groups to gather consumer perceptions on gas and electricity. Mr. Wade noted that many consumers are not aware about the value of services provided by EPB. Mr. Miller added that certain names for meters, such as the “smart meter,” may incite objection among consumers. Ms. Lefkowitz added that very few customers were unhappy about getting a meter.

Mr. Popowsky and Ms. Lefkowitz discussed the conditions in New Jersey with regard to outage restoration and outage detection in the absence of AMI. Ms. Lefkowitz noted that AMI’s biggest benefit is the ability to automate outage management and workforce dispatch to pinpoint outages. Ms. Lefkowitz noted that AMI allows Pepco to simultaneously resolve smaller outages and dispatch crews to fix larger outages.

Ms. Lefkowitz described how savings accrued from these measures are reflected in customers’ bills and remarked that the biggest savings are a result of cumulative efforts of driving consumers to consume less. Mr. Till and Ms. VanZandt discussed the need for improvement in load models, especially with regard to aggregation of smaller loads. Mr. Miller added that he is seeing issues in calibrating power-flow models to meters. Ms. VanZandt said that a missing element in power system modeling is simulating turbine controls for generator models. Mr. Miller noted that there is a deficiency for looking at the performance impacts of boiler deterioration in the current generation of models. He also noted that researchers at DOE’s Office of Fossil Energy’s National Energy Technology Laboratory (NETL) are working to improve the accuracy of those models.

Mr. Centolella asked about new technologies that face difficulties in passing proof of concept to reach widespread deployment. Mr. Centolella asked for recommendations to help facilitate a stronger pathway for innovation in the utility sector. Ms. Lefkowitz responded that utilities are risk averse because of regulatory obligations and explained that if there is no incentive for a utility to invest in something they cannot recover from, there is no impetus to undertake technology risk. Ms. Lefkowitz noted that a product that is not marketable and does not have the support from a company to manage its evolution will face difficulties. Ms. VanZandt underscored the necessity that whoever is personally deploying any product must see direct benefits. Mr. Miller added that there might be helpful models to describe the process of technologies diffusion.

Mr. Morgan asked Mr. Miller to expand upon conservation voltage reduction (CVR) in long rural feeders. Mr. Miller responded that NRECA has developed several approaches for CVR and that communication has been a critical component. Ms. Lefkowitz noted that all of Pepco’s technology solutions must adapt to the density of the load and future build-out of feeders.

Ms. VanZandt explained how ARRA funding impacted the infrastructure. She noted that the funding allowed her to deploy over 600 phasor measurement units (PMUs). Mr. Bose and Ms. VanZandt discussed the costs and benefits of PMU deployment and model validation.



### **EAC Power Delivery Subcommittee Activities and Work Plan**

Mr. David Till provided an update on the EAC Power Delivery Subcommittee activities and work plan. He explained that the Power Delivery paper aims to address the need for dynamic voltage support on the system and to provide some guidance to stakeholders on the issue. Mr. Till stressed the importance of communication between all parties involved in the process. He invited EAC members to participate in the workgroup.

### **EAC Energy Storage Subcommittee Activities and Work Plan**

Mr. Chris Shelton reviewed the Energy Storage Subcommittee plans. Mr. Shelton explained that the National Strategy for DES in the Electric Grid paper will be finished in 2015. The Implications of High Penetrations of Energy Storage into Electric Transmission and Distribution Systems paper is proposed for 2015-2016 to look at implications of high energy storage on the overall grid system. He also noted that the next Biennial Storage Program Assessment paper is proposed for 2016. He urged EAC members to review the materials circulated to the group ahead of the meeting. Mr. Shelton welcomed members to provide feedback before the final outline and acknowledged the suggestion to incorporate expert interviews in future efforts.

### **EAC Member Discussion of Energy Storage Subcommittee Plans**

Mr. Cowart thanked Mr. Shelton and invited EAC members to ask questions on the Energy Storage subcommittee's activities and work plan.

Mr. Centolella suggested framing the paper in terms of function rather than technology. He said that a functional (rather than technical) definition helps address the problem in different ways.

Mr. Cowart suggested that increasing storage penetrations could accelerate the drive toward distributed generation. Mr. Shelton confirmed that the subcommittee has begun discussing possible scenarios and the implication on reliability. Mr. Coe remarked that the market studies being discussed in the DES paper mirror these types of high-PV scenarios.

### **Wrap-up and Adjourn March 2015 Meeting of the EAC**

Mr. Cowart thanked everyone for their comments. The next EAC meetings are scheduled for June 29-30, 2015 and September 29-30, 2015. Mr. Cowart adjourned the March 2015 meeting.

Respectfully Submitted and Certified as Accurate,



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Richard Cowart  
Regulatory Assistance Project  
Chair  
DOE Electricity Advisory Committee

5/12/2015

Date

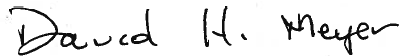


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Irwin "Sonny" Popowsky  
Pennsylvania Consumer Advocate  
Vice-Chair  
DOE Electricity Advisory Committee

5/12/2015

Date



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David Meyer  
Office of Electricity  
Designated Federal Official  
DOE Electricity Advisory Committee

5/12/2015

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Matthew Rosenbaum  
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5/12/2015

Date