



**U.S. Department of Energy  
Electricity Advisory Committee Meeting  
NRECA Conference Center  
Arlington, VA  
June 30, 2015**

**Summary of Meeting**

## **PARTICIPANTS**

### **EAC:**

**ANJAN BOSE**  
Washington State University

**MERWIN BROWN**  
California Institute for Energy & Environment

**MARILYN BROWN**  
Georgia Institute of Technology

**CARLOS COE**  
Millennium Energy

**RICHARD COWART**  
Regulatory Assistance Project

**ROBERT CURRY**  
CurryEnergy

**CLARK GELLINGS**  
Electric Power Research Institute (EPRI)

**MARK LAUBY**  
North American Electric Reliability Corporation

**GRANGER MORGAN**  
Carnegie Mellon, Engineering & Public Policy

**TIMOTHY MOUNT**  
Cornell University

**SONNY POPOWSKY**  
EAC Vice Chair

**WANDA REDER**  
S&C Electric Company; IEEE

**PAUL ROBERTI**  
Rhode Island Public Utilities Commission

**HEATHER SANDERS**  
California Independent System Operator

**PAM SILBERSTEIN**  
National Rural Electric Cooperative Association

RAMTEEN SIOSHANSI  
Ohio State University

ROY THILLY  
Independent

DAVID TILL  
Tennessee Valley Authority

GORDON VAN WELIE  
Independent System Operator of New England

REBECCA WAGNER  
Nevada Public Utilities Commission

CARL ZICHELLA  
Natural Resources Defense Council

**DOE:**

RAKESH BATRA  
Department of Energy

HONORABLE PATRICIA HOFFMAN  
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KEVIN LYNN  
Department of Energy

ELI MASSEY  
Department of Energy

DAVID MEYER  
Department of Energy

JOSEPH PALADINO  
Department of Energy

MATT ROSENBAUM  
Department of Energy

JULIE SMITH  
Department of Energy

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

STEPHANIE AYERS  
IMCORP

DENIS BERGERON  
Maine Public Utilities Commission

LELAND COPLIANI  
Lewis-Burke

KEN DONOHOO  
Oncor Electric Delivery Company

JAMES GALLAGHER  
New York State Smart Grid Consortium

JULIET HOMER  
Pacific Northwest National Laboratory

PATRICK HUGHES  
National Electrical Manufacturers Association

EDWARD KRAPELS  
Anbaric Holding LLC

DOUG OBEY  
Inside EPA

JAMES PEDERSON  
Federal Energy Regulatory Commission

NANCY PFUND  
DBL Investors

DAVID TREICHLER  
Oncor Electric Delivery LLC

**ICF/Support:**

ANDREA WAGNER  
ICF International

MAUREEN MALLOY  
ICF International

SAMIR SUCCAR  
ICF International

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**Microgrids: Current and Future Development Panel**

Ms. Wanda Reder introduced the Microgrid panelists including: James Gallagher, Executive

Director, New York State Smart Grid Consortium; Edward Krapels, CEO, Anbaric Holding LLC; Nancy Pfund, Founder and Managing Partner, DBL Investors; and David Treichler, Director Business Development and Financial Modeling, Oncor Electric Delivery LLC.

The first panelist, James Gallagher, Executive Director of the New York State Smart Grid Consortium, presented his views on New York's microgrid initiatives. The New York State Smart Grid Consortium aims to facilitate stakeholder collaboration in order to identify barriers, capture and support grid initiatives, and implement energy policy that supports solutions and advancement of the grid. Consortium efforts around microgrids include the NY microgrid inventory, which includes key characteristics, owners, and implementation. The Consortium would like to see more microgrid diversity and community involvement, and plans to use the inventory to identify the microgrids with the most business interest, economic gain, and highest community engagement to determine the next set of investments. Case studies are financed through government funding and utility investment and are used to identify lessons learned and determine needs with regard to business models, regulations, system design, and system valuation.

Mr. Gallagher's recommendations include clarification of asset ownership, valuation of benefits, operator training, early stakeholder engagement with heavy utility involvement, reduction of legal and regulatory barriers, standardization of pilot projects, recognition of the need for backup generators, and more targeted fees. The next phase is to implement the best 80 projects based on the lessons learned. The objectives of these new projects are to engage the customers, introduce active network controls, incorporate clean generation and energy storage, and engage the maximum amount of outside capital to increase economic feasibility and reduce overall utility cost.

The second panelist, Edward Krapels, CEO, Anbaric Holding LLC, discussed the advancement of microgrids and how they can help fill in gaps on the system. The objective of Anbaric microgrids is to develop a model that can be repeated in order to encourage investment and ownership of microgrids. Areas for microgrid entry and investment include utility infrastructure to correct system disruption due to natural disaster, grid modernization efforts, and efforts to meet clean energy standards. This critically depends on stakeholders with the space and materials to invest. Such stakeholders include large factories that require extensive and predictable power and universities and hospitals that require electric grid reliability and resiliency.

Mr. Krapels explained the goal of these public-private microgrid initiatives is to demonstrate and provide an economic platform for microgrid investment and technology development. The market for microgrids is expanding and the success of future projects is expected to be based on market economics and not government subsidies.

The third panelist, Nancy Pfund, Founder and Managing Partner, DBL Investors, discussed the current and future development of microgrids. Ms. Pfund explained that microgrid investment is done with financial return in mind as well as the social and environmental benefits of driving grid infrastructure improvements. Microgrids are being financed by a host of stakeholders and investment is being driven by the declining cost of storage and grid management and

improvement of data management and the associated software. This is further motivated by goals around carbon emission reduction and air quality improvement; job creation; utility fear of missing investment opportunities, as was the case with solar; and the opportunity to address social justice issues in low income communities.

Ms. Pfund further noted that all energy is subsidized. Similarly, government help is needed with microgrids to offset the heavy upfront costs. This allows companies to make large long term investments that continue to help solve problems and facilitate the commercial market. There is a need for large scale projects and increased interdependent microgrid investments that interact and work with the grid, enabling the identification of appropriate sources of power in real time and maximizing grid capability. Ms. Pfund recommended: the development of policies that reduce barriers to microgrid market entrance and create financial incentives for large scale investment, less prescriptive and more qualitative mandates, movement away from stand-alone pilot projects and towards large scale investments with higher returns, allowing utility market entrance through recognition of grid infrastructure as a service, and promotion of stakeholder meetings that discuss best practices and lessons learned. She suggested the government play a role in creating flexible and adaptable policies such as mandates and behind the meter rebates to attract and facilitate investment from leading players.

The fourth panelist, David Treichler, Director of Business Development and Financial Modeling at Oncor Electric Delivery LLC, provided a utility perspective on the importance of grid integration for accommodating a growing population while still maintaining grid reliability. The grid needs to change in order to accommodate more people in a short amount of time. This would require heavy investments in traditional grid infrastructure or could be achieved through grid modernization efforts. Mr. Treichler explained the need for the future grid to adapt to growing and changing demands and how microgrids and energy storage will be important aspects of addressing those needs. Challenges that face this effort include high battery costs, the lack of price transparency, and the level of control and management required to manage thousands of endpoints.

Mr. Treichler noted that microgrids are already addressing some of these issues with the development and investment in batteries for electric cars. Oncor's operational microgrid was designed for renewable integration, onsite generator integration, and used as much technology and as many suppliers as possible to better understand how to integrate and operate these systems. Mr. Treichler discussed Oncor's lessons learned and suggested the development of standards that support microgrid development and implementation, repeatable models, scalable controllers, a better understanding of all components to increase interoperability of microgrids with the grid, and recognition of storage as a dual asset and not a generation asset.

### **EAC Members Discussion of Microgrids Panel**

Pr. Morgan, Mr. Till, and Mr. Gallagher discussed the issue of storage and microgrids infringing on exclusive service territory. There are issues surrounding current storage and microgrid activity, including the legality of selling self-generated electricity to neighbors, which varies between states. Mr. Curry added that there may be methods for side-stepping these laws to

expedite markets in New York.

Mr. Brown raised the question of feasibility of microgrid operability, which is needed to realize benefits. Panelists explained who is responsible for operation will vary by case but will likely still call for the involvement of the utility or an entity with similar experience. Microgrid technology is rapidly advancing towards active management which presents a great opportunity for utilities to control microgrids as well as providing a point of entry for companies to collaborate for interoperability. Meeting attendees agreed that the grid is too useful to abandon and the entry of microgrids will not make the current grid obsolete.

Mr. Curry discussed the threat of grid disruption that microgrids pose to utility representatives on Wall Street, who are currently focusing on raising capital, and asked how to bridge the gap between microgrid cost and advantages for utilities. Mr. Treichler explained that the high cost of microgrids will make them a backup system to the power grid. However, utilities will be looking to develop higher reliability solutions that could include, but are not limited to, microgrids and the selected solutions will depend on cost. Mr. Krapels added that microgrids are following the common progression of funding, starting with the government, followed by utilities, and then vendor and capitol investors that will likely provide great microgrid models. The challenge that arises is structuring funding so the rate payer does not absorb the cost of microgrids.

Mr. Bose noted two opposing microgrid scenarios which appear to depend on the area's microgrid pricing, market, and policies. The first is the need of microgrids for resiliency and the second is the need to develop business models that attract capital and create an open market. Panelists discussed the utility realization of microgrid services including increasing reliability; grid backup, specifically in times on natural disasters; and a cost effective low carbon emission electric service. The ability for microgrids to meet social and environmental responsibilities attracts a larger group of stakeholders and available government funding as well as investors looking for generation and load optimization through islanding, which is driving the cost down.

Mr. Popowsky, Mr. Gallagher, and Ms. Pfund discussed the difficulty of monetizing the resiliency benefits to the grid and society as a whole. Mr. Mount and Mr. Treichler added that the tradeoff between storage and storage capacity is not well reflected in rates, resulting in an undervaluation. The value, specifically with load reduction, and who should be making the effort to change rates to reflect storage value needs to be addressed. Members discussed the barriers to changing rates, including rate acceleration and adequate demand, and speculated that microgrids could be added to the grid without changing rates by 2020.

Mr. Krapels suggested that changing capacity regimes will favor investment in capital that can respond to grid needs in real time. Members discussed the impediments to microgrid participation in the wholesale market including the current regulatory structures, the lack of incentives for microgrid market entry, and the lag between rate making at the state level and market developments that need to be addressed in real time. Possible solutions discussed included adapting the regulatory framework to use customer choice to fund the wholesale market and location-based and real-time pricing on the distribution system.

Panelists discussed the regulatory hurdles that microgrids face including the regulatory variations between states. Mr. Treichler suggested that the EAC compile a list of microgrid barriers, organized by state, that could provide insight into current and forthcoming projects, project commonalities, distribution of government funding, methods for addressing issues, and best practices.

Mr. Cowart discussed possible models for microgrid adoption including adoption of microgrids as utility offerings, such as a grid infrastructure service, or allowing entry of a third party, independent of the incumbent grid, that invests and owns microgrids. Members discussed which model is the most likely in light of the rapid technology development and agreed that utilities are an essential platform for microgrids. Thus, the most likely model is a hybrid where companies and utilities collaborate to address control issues, prevent system disruption, expedite microgrid adoption and market development, improve grid resiliency, realize the social and environmental benefits, and better utilize the grid. One significant challenge is to convey to customers the value of the service that the electric grid provides.

### **EAC Energy Storage Subcommittee Activities and Plans**

Mr. Brown provided an update of activities and plans for the EAC Energy Storage Subcommittee. Mr. Brown highlighted three papers that the Energy Storage Subcommittee is working on between 2015 and 2016. The “National Strategy for Distributed Energy Storage in the Electric Grid” white paper is a joint effort by the EAC Smart Grid Subcommittee and the Energy Storage Subcommittee (to be completed in late 2015). The “Implications of High Penetrations of Energy Storage into Electric Transmission and Distribution Systems” white paper is expected to be complete in 2016. The Biennial Storage Program Assessment paper is expected to be complete in 2016 as well.

### ***Status of High Storage Penetration Scenario Analysis Paper***

Mr. Brown presented on the proposed work product on “Implications of High Penetrations of Energy Storage into Electric Transmission and Distribution Systems”. Mr. Brown stated that the purpose of the white paper is to qualitatively examine the implications of high penetrations of energy storage on the electric transmission and distribution systems and to provide a framework for defining grid technology research and development that would enhance the benefits and mitigate the dislocations of high penetrations of energy storage.

Mr. Brown reviewed the challenge of how to analyze the future implications of high penetrations of energy storage given the complexity and uncertainty facing the electric grid. He highlighted the importance of scenario planning to perceive possible futures. The scenarios are plausible narratives of alternative environments and highlight the risks and opportunities of strategic issues. He noted the Energy Storage Subcommittee is using a simplified scenario planning process. The different plausible futures are the logical implications of cause and effect interactions in each scenario between two highly uncertain variables. Mr. Brown provided an example of using the simplified planning process to create four future scenarios and discussed the three frameworks the Energy Storage Subcommittee is considering for the study. Mr. Brown

presented his personal suggestions on several key factors related to the issue.

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

Mr. Gellings noted that the drivers outlined in the paper should reflect the consensus view of the Subcommittee. Mr. Brown responded that the key issues presented were to provide a starting point for the Subcommittee and that further input will be elicited before arriving at a final framework for the paper.

Mr. Zichella and Mr. Gellings noted the substantial amount of work still needed to complete the white paper. Mr. Cowart raised the possibility of an in-person meeting for participants working on the white paper.

### **Public Comments**

No public comments were made.

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

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

Respectfully Submitted and Certified as Accurate,



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Richard Cowart  
Regulatory Assistance Project  
Chair  
DOE Electricity Advisory Committee

9/14/2015

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Date



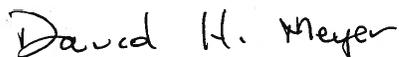
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Irwin "Sonny" Popowsky  
Pennsylvania Consumer Advocate  
Vice-Chair  
DOE Electricity Advisory Committee

9/14/2015

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Date



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David Meyer  
Office of Electricity  
Designated Federal Official  
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9/14/2015

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Matthew Rosenbaum  
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9/14/2015

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Date