U.S. Department of Energy
Electricity Advisory Committee Meeting
NRECA Conference Center
Arlington, VA
June 6, 2013

Summary of Meeting

PARTICIPANTS

EAC:

BILLY BALL
Southern Company

LINDA BLAIR
Executive Vice President, ITC Holdings

MERWIN BROWN
California Institute for Energy & Environment

PAUL CENTOLELLA
Vice President, Analysis Group

BOB CURRY
Commissioner Emeritus, NY; Charles River Associates

CLARK GELLINGS
Electric Power Research Institute

DIAN GREUNICH
Dian Greunich Consulting

PAUL HUDSON
Stratus Energy Group, Austin

SUE KELLY
American Public Power Association

RALPH MASIELLO
DNV KEMA

CLAIR MOELLER
Midcontinent Independent System Operator

GRANGER MORGAN
Carnegie Mellon, Engineering & Public Policy

JAY MORRISON (for BARRY LAWSON)
National Rural Electric Cooperative Association

CHRIS PETERS
Entergy Services Inc.

SONNY POPOWSKY

EAC Vice Chair

WANDA REDER
S&C Electric Company; IEEE

PHYLLIS REHA
Commissioner Emeritus, Phyllis Reha Consulting

BRAD ROBERTS
Electricity Storage Association

TOM SLOAN
State Representative, Kansas

DAVID TILL
Tennessee Valley Authority

GORDON VAN WELIE
ISO New England

REBECCA WAGNER
Nevada Public Utilities Commission

MIKE WEEDALL
Bonneville Energy Administration

DOE:

CAITLIN CALLAGHAN
Department of Energy

PATRICIA HOFFMAN
Assistant Secretary for Office of Electricity

CYNTHIA HSU
Department of Energy

HOLMES HUMMEL
Department of Energy

STEVE LINDENBERG
Department of Energy

ALICE LIPPERT
Department of Energy

LARRY MANSUETI

Department of Energy

DAVID MEYER
Office of Electricity

TITILAYO OGUNYALE
Department of Energy

ERIC ROLLISON
Department of Energy

MATT ROSENBAUM
Office of Electricity

CYNTHIA WILSON
Department of Energy

JON WORTHINGTON
Department of Energy

Public:

SHARLA ARTZ
Schweitzer Engineering Laboratories

JONATHAN BLANSFIELD

PAUL BOLLINGER
Maryland Energy Administration

DREW BOND
Battelle

ELIZABETH BRINTON
Sacramento Municipal Utility District

RICHARD CAMPBELL
Congressional Research Service

JIM CREEVY
National Electrical Manufacturers Association

CHARLES GRAY
National Association of Regulatory Utility Commissioners

BRIAN HANSEN
Platts

KATHERINE HAMILTON
Electricity Storage Association

JESSICA HARRISON
KEMA

MOHSEN JAFARI
Rutgers University

DANIEL JANG

BEN KAUN
Electric Power Research Institute

CHERYL LA FLEUR
FERC Commissioner

DAVID MARCHESA
Haddington Ventures

RICK MILLER
Consultant HDR Engineering

ANGELA NICHOLS
Oklahoma Gas & Electric

JUDITH SCHWARTZ
To the Point, Consultant Consumer Engagement

MARY BETH TIGHE
Federal Energy Regulatory Commission

MARY TOLER
Battelle

ICF/Support:

SHERI LAUSIN
ICF International

JANINE MIGDEN-OSTRANDER
Regulatory Assistance Project

ELLIOT ROSEMAN
ICF International

CODI SHARP
ICF International

SAMIR SUCCAR
ICF International

* * * * *

Panel – Energy Storage Valuation

Sonny Popowsky welcomed everyone to the second day of the June 2013 Electricity Advisory Committee (EAC) meeting. He explained that the day would start with an excellent panel on storage issues, and then the committee would review edits to the Consumer Acceptance White Paper and Race to the Top revisions before the break. Mr. Popowsky introduced the chair of the Storage Subcommittee, Mr. Ralph Masiello.

Mr. Masiello explained that the panel would address the value energy storage for different applications. Panelists would discuss different types of storage, such as hydroelectric and natural gas storage, storage valuation, and supply-chain logistics and manufacture of storage. Mr. Masiello introduced the storage valuation panelists including: Rick Miller, HDR Engineering; David Marchese, Haddington Ventures; Ben Kaun, EPRI; Jessica Harrison, KEMA; and Mohsen Jafari, Rutgers University.

Mr. Miller discussed the need for monetizing strategic flexibility in energy storage technologies. He used BPA and Idaho Power as examples and explained how they complement wind energy with another source like hydropower to provide grid flexibility and reliability. In the future, energy storage and markets need incorporate pricing effects from solar generation during the day and curtailment. He suggested that storage should be a new asset class, separate from transmission and generation.

Mr. Marchese described the background of his Haddington Ventures. He then discussed the value of compressed-air energy storage (CAES) and some of their CAES projects across the country. Mr. Marchese described value of regulation (and deregulation) of natural gas storage as an analogy to the value of electricity storage regulation in the future.

Mr. Kaun discussed the direct and indirect benefits and costs of energy storage. In most cases, the cost of energy storage exceeds the benefit from providing a single service, so he suggested that flexible storage is critical in order to stack benefits. Mr. Kaun discussed a valuation methodology that will 1) define grid services, 2) combine benefits to find cost-effective storage options, 3) evaluate how cost-effective options perform, and finally 4) dig into the structure of the regulatory system. EPRI is developing a tool, called the "Energy Storage Valuation Tool," that will support the second step of this process.

Ms. Harrison discussed some of the common pitfalls for storage valuation, including ignoring system effects. She compared system effects of energy storage to individual-level effects to demonstrate the need for regulation requirements in energy storage wholesale markets. Ms.

Harrison also gave a preview of analyses of a CPUC's ancillary services, substation-sited storage, and behind-the-meter storage. KEMA is using an end-user simulation, which they call a "microgrid optimization model."

Dr. Jafari discussed the logistics and supply chain of energy storage. He described systems for generating demand, like push/pull systems and the Just in Time system, and meeting demand, like Kanban control, line balancing, Manufacturing Execution Systems, Manufacturing/Material Requirements Planning, and Enterprise Resource Planning. Dr. Jafari also outlined strategies for risk management and drew parallels between logistics/supply chain of energy storage and power.

EAC Discussion of Storage Valuation Panel Topics

Brad Roberts asked Mr. Marchese about the charges for ancillary service in the ERCOT market.

Mr. Marchese described the megawatt requirements for each load-serving entity in the ERCOT market.

Chris Shelton asked for clarification about the statement that there is diminishing return of storage in the wholesale market.

Ms. Harrison responded that the analysis was only for the regulation market and a particular dispatch algorithm. Mr. Masiello added that the diminishing returns were analyzed in the context of fixed performance subject to market rules.

Mr. Shelton also asked for clarification about the statement that storage is more expensive than its value.

Mr. Kaun responded that storage provides multiple services, and different services require different technologies that often compete with one another. And it is sometimes, but not always, difficult to achieve cost effectiveness for storage by relying on a single application. He noted that frequency regulation might be one exception of a single-stream business case for storage, but he also noted that is typically a relatively thin market

Mr. Curry asked about how tax benefits to energy storage would affect benefits to the end user in EPRI's models.

Mr. Kaun and Mr. Gellings clarified that EPRI does not engage in policy or advocacy.

Mr. Marchese commented that he incorporates tax credits into his economic models as early as possible to predict prices for customers.

Mr. Miller asked about how CPUC models the variability of input.

Ms. Harrison described the system used for wholesale-market modeling and for the distribution system. Mr. Masiello clarified that Ms. Harrison did not say storage has a positive value. Mr. Kaun also described the price data that EPRI uses for CPUC analysis.

Merwin Brown asked if extreme differences in the electricity commodity market will distort the analogy to other commodities to the extent that the analogies break down.

Mr. Jafari responded that these are not physical analogies, they are conceptual. There are lessons learned that are useful even though the analogies are stretched.

Clair Moeller asked if there was a on-peak vs. off-peak energy spread target that gives you a break-even gas price value for storage viability.

Mr. Marchese responded that the break-even point is about $3 for gas for his project. However, the value of storage is very system-specific and application-specific.

Patricia Hoffman asked Dr. Jafari how the thought process would change by considering the California new load figure that Rick Miller showed.

Dr. Jafari responded that the new solution California presents changes the business model and thus changes the metric. Storage valuation must consider the new metrics, which may not all be quantitative.

Assistant Secretary Hoffman commented that we need to define the range where storage becomes profitable and what is necessary (e.g., incentive processes) to achieve this range.

Mr. Marchese responded that developers of energy storage assets would benefit from certainty. Better understanding of reliability, must-run, and ancillary effects of existing assets used to maintain reliability would help developers understand the real cost of keeping the grid up. A framework for people outside the organized markets would also be helpful including an investment tax credit to make the capital costs comparable with a CCGT.

Mr. Miller added that we need to create market structures to explicitly incentivize flexibility and storage in the future in order to pay for these features. He suggested that the Office of Energy Policy and Innovation, FERC, should be linked with smart market structures.

Assistant Secretary Hoffman asked about the CPUC rulemaking and its application to other states. She asked what other states, besides California, are doing to develop energy storage valuation methodologies.

Ms. Harrison responded that the CPUC rulemaking has provided three important resources that can be applied in other areas: 1) definitive statements about cost-effectiveness, 2) highlighting barriers and successes in a public setting, and 3) framework for regulatory approval of energy storage.

Mr. Kaun added that the CPUC analysis provides a great framework, but differences in use cases, technologies, etc. will need to be considered to apply its lessons to other regions.

EAC Storage Subcommittee Activities and Plans for 2013

Mr. Masiello asked if there was interest in developing a white paper on storage valuation as discussed in the panel. Susan Kelly offered to contribute the consumer perspective to this white paper. She commented that storage facilities want to be considered as both generation and transmission, which is not sustainable.

Mr. Masiello discussed the activities of the Storage Subcommittee and the plans for 2013 including: a white paper on Business Model and Risk Mitigation and a white paper on Energy Storage Valuation. There was interest in developing an Energy Storage Valuation white paper as just discussed. Mr. Masiello outlined the main points of the draft Business Models and Risk Mitigation white paper that will be presented at the October meeting for a vote of approval. The paper was drafted to identify existing business models in the regulatory system and how DOE can contribute to developing these models, e.g., identify technology risks for utility investment.

Gordon Van Welie, who is also involved in developing the Business Models and Risk Mitigation paper, discussed that the role of storage assets in the market place is not well defined or regulated. There are different procedures for pursuing different goals like maximizing integration of renewables to vs. maximizing reliability services at the lowest cost. Mr. Van Welie concluded that from the grid operator's perspective, the key is optimizing grid reliability and consumer surplus, regardless of whether producers or consumers receive the consumer surplus.

Mr. Shelton agreed with Ms. Kelly and Mr. Van Welie, but noted that their ideas assume the incumbency of technology and inadvertent impediments created by the incumbency of technology. We must consider the flexibility of storage when building generation and storage resources.

Mr. Shelton agreed with Ms. Kelly that storage should not straddle the generation and transmission classes. EAC must stay broad and consider both new and existing projects.

Mr. Masiello outlined the rest of the Business Models and Risk Mitigation paper. He encouraged members to comment electronically because the paper will be further discussed at the October meeting.

Mr. Brown and Mr. Shelton discussed congestion and the effects on de-risking transmission but not de-risking the generation demand/response or storage method.

Ms. Kelly commented that Order 1000 will possibly address some of these congestion issues by requiring the consideration of non-transmission alternatives.

Mr. Van Welie discussed ways to relieve congestion. There is a possibility to expand these methods to generation and storage. He also agreed with Ms. Kelly's point that storage should not be able to double-dip and earn market revenue.

Mr. Popowsky thanked the storage valuation panel and Mr. Masiello for the enlightening discussion. He announced that Assistant Secretary Hoffman, DOE, would address the committee

before the break. After the break, the committee would finalize the Race to the Top and Compact revisions as discussed on the first day of the meeting.

Assistant Secretary Hoffman discussed updates about the energy storage paper for Senator Wyden. She will ask the Storage Subcommittee and the general EAC to review the paper. Two workshops will be held for the community and stakeholders.

Tom Sloan asked about the Senator's timeline and if it would be valuable for EAC to develop a separate report without the limitations of OMB.

Assistant Secretary Hoffman responded that the deadline was about 14 days away and that it is always valuable for EAC to fill in gaps that DOE cannot cover in their reports. The EAC then took a 15 minute break.

Recommendations on the DOE Race to the Top Initiative and Compact

Mr. Popowsky welcomed the EAC back from the break. He summarized the changes made within the Race to the Top document in detail.

Dian Greunich asked about "technical assistance" that incorporate behavioral science

Assistant Secretary Hoffman replied that for the SmartGrid projects, designing consumer behavior studies was considered "technical assistance."

Ms. Greunich thanked her for the clarification.

Mr. Popowsky asked if they were ready for a motion to approve the changes.

Bob Curry moved.

Wanda Reder seconded the motion.

The DOE Race to the Top Initiative paper was unanimously approved by the EAC.

Mr. Van Welie asked if there were any issues with the edits to the Compact document that were distributed.

Mr. Sloan moved to accept the changes and another member seconded the motion.

Mr. Popowsky commented that the changes made the recommendation more generic instead of specific to the compact. He asked for a vote.

The changes were unanimously approved by the EAC.

Panel: Consumer Acceptance Issues for the Smart Grid

Mr. Curry discussed the timeliness of the Smart Grid acceptance issue. He introduced the three experts: Judith Schwartz, To the Point; Elizabeth Brinton, Sacramento Municipal Utility District (SMUD); and Angela Nichols, Oklahoma Gas & Electric.

Ms. Schwartz showed a video from the Green 2 Growth Summit to convey some of the enthusiasm for Smart Grid and technology advances. Ms. Schwartz emphasized that customers have different priorities, and utilities will need to market themselves differently based on different customers and regulatory environments. She gave examples of ways that companies are effectively communicating with customers (e.g., the 90, 60, 30 protocol, proactive customer support, two-way online participation, and energy literacy workshops) and encouraged members to review the toolkit that will be available online soon.

Ms. Brinton gave an overview of SMUD's history and company structure. She discussed the Smart Grid Pilot project in Sacramento, which was supported by a DOE grant. Ms. Brinton described the success that SMUD has had engaging the community and using the Smart Meter to bring more flexibility, comfort, and cost-certainty to customers. SMUD has also faced challenges customers who were not satisfied with the Opt-Out options and a small group of people fiercely opposed to the whole project.

Ms. Nichols discussed Oklahoma Gas & Electric's Smart Grid program. She explained the company's customer-focused features, which have allowed customers to save money, have control, have a choice in their price plan, and build trust in the company. Ms. Nichols summarized the major lessons learned (e.g., customers appreciate automated technology that helps customers save, customers appreciate daily communication of prices, engage utilities staff so they promote the program inside and outside of work, enrollment must be easy for customers, provide educational resources like online videos for customers).

EAC Member Discussion of Customer Acceptance Panel Topics

Mr. Curry thanked the panelists. He noted the key take away from his prior work in New York that rates were going up because people are using less electricity is rarely conveyed to the public.

Mr. Curry also asked Ms. Brinton if the SMUD Smart Grid pilot would have been possible without the DOE grant. Ms. Brinton responded that SMUD would not have been able to give customers as much support without the grant nor move as quickly and launch the program at the same scale.

Ms. Reder discussed the Smart Grid paper that was released last fall on consumer acceptance. The evidence shows that consumer outreach must come first, even if technology is at the foundation.

Ms. Reha asked about costs for outreach and outside consultants.

Ms. Nichols responded that outreach costs were small compared to operations, and Oklahoma Gas & Electric hired outside groups for the website, outreach, and consumer research.

Ms. Brinton responded that SMUD's outreach budget for the Smart Grid Pilot was in addition to its typical outreach/marketing campaign, and they also worked with outside consultants.

Mike Weedall asked how industry can change to better involve customers.

Ms. Schwartz and Ms. Brinton responded that industry needs to allocate more money and time to outreach. Ms. Nichols added that customer outreach is a long term relationship, so industry need to keep engaging customers.

Granger Morgan asked if meters are the most cost-effective way to achieve savings considering that only certain customers take advantage of the cost-saving information that the meter provides.

Ms. Brinton responded that time-of-use is cost-effective, and SMUD has transparency so they can share these savings directly with customers.

Assistant Secretary Hoffman commented on the value of accuracy, as opposed to over-estimation, in outage management. Industry should share best-practices for outage management. She also commented on peak-load reduction avoidance and the development of customer value.

Assistant Secretary Hoffman noted that in the future, we need to develop a system of resiliency for Smart Grid, and she asked if there was need for conducting another pilot.

Mr. Curry responded that most utility commissions do multi-year rate cases because it's more cost effective. They offer incentives on return-on-equity to encourage utilities to be less flexible with the possibility of true-ups at the end.

Mr. Centolella asked Ms. Brinton about California's ramping requirements for renewable energy in relation to the automation that would allow devices in customer homes to respond to changes.

Ms. Brinton responded that SMUD is moving toward time-of-use, so the automation of devices is a good step. However IT capacity cannot support the big commercial and industrial partnerships that are critical for dealing with large grid management questions yet.

Mr. Succar announced that the committee would vote on the Consumer Acceptance paper after the break, at 2:00 pm.

Mr. Popowsky reminded members of the public to sign up if they wanted to address the committee at 3:10 pm. The EAC then took an hour break for lunch.

EAC Smart Grid Subcommittee Papers and Work Plans for 2013

Mr. Popowsky welcomed everyone back from the lunch break.

Mr. Succar asked everyone to sign in for the second day if they had not done so already. He also introduced Codi Sharp, the new ICF support staff for the EAC.

Ms. Reder introduced the Consumer Acceptance paper, which was led by Mike Weedall.

Mr. Weedall thanked everyone for their hard work on the paper. He gave an overview of the paper and the recommendations for DOE. Mr. Weedall asked if there were any questions or further edits for the paper.

Ms. Greunich requested that the bulleted summary of DOE recommendations be moved to the front of the paper. She also recommended several language edits that were discussed and changed during the meeting.

Mr. Brown commented that the statement the "consumer acceptance is not controversial" creates an inaccurate mindset.

Mr. Popowsky suggested deleting this sentence.

Pr. Morgan moved to accept changes.

Mr. Curry seconded.

The EAC unanimously accepted the changes to the Smart Grid Consumer Acceptance paper.

Ms. Reder introduced an upcoming white paper on Cyber Security, led by Chris Peters.

Mr. Peters is working with ICF and DOE to create on an outline for the paper. He gave an overview of the progress.

Pr. Morgan requested that the cyber security paper differentiate between the domains in which cyber security arises (e.g., business operations vs. distribution system-level operations). He also requested that the paper acknowledge the importance of physical security in addition to cyber security.

Ms. Reder introduced the smart grid research and development paper, which will be a combined effort between the Transmission and Smart Grid Subcommittees. The Transmission Subcommittee will focus on resiliency in relation to smart grid technologies. Mr. Gellings and Billy Ball are leads for the paper. Ms. Reder also introduced a parallel paper that will be more focused on policy than technology. This paper will cover metrics, decision-making frameworks, and tools.

Mr. Gellings gave an overview of the papers in development in relation to this topic: 1) research and development, led by himself and Mr. Ball; 2) resiliency, led by David Till; 3) regulatory policy tools, led by Mr. Centolella; and 4) policy changes that should be considered for resiliency, led by Mr. Masiello.

EAC Discussion and Decision on Smart Grid Subcommittee Plans and Recommendations

Assistant Secretary Hoffman asked if the R&D piece should integrate anything from ARPA-E, e.g., AC/DC integration at the distribution level, GridLAB-D modeling of the distribution system, and/or tools available.

Mr. Gellings agreed that ARPA-E projects could be valuable additions to the R&D paper, but that technologies that would not likely be commercially available before 2030 would likely be outside the scope of the EAC's recommendations.

Ms. Kelly suggested that the paper consider safety issues of emerging technologies.

Ms. Greunich commented that she attended a conference on transactive energy and will distribute the paper to the EAC.

Ms. Reder thanked everyone for their contributions.

Mr. Popowsky announced that the next EAC meeting will be held on October 2nd and 3rd at NRECA. He asked if there were any public comments; there were none.

Ms. Reder moved to adjourn the June EAC meeting.

Mr. Ball seconded.

The June EAC meeting was adjourned.

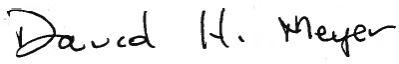
Respectfully Submitted and Certified as Accurate,

Richard Cowart
Regulatory Assistance Project
Chair
DOE Electricity Advisory Committee

9/10/13
Date

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

9/10/13
Date



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

9/10/13
Date

Matthew Rosenbaum
Office of Electricity
Designated Federal Official
DOE Electricity Advisory Committee

9/10/13
Date