U.S. Department of Energy
Electricity Advisory Committee Meeting

National Rural Electric Cooperative Association Conference Center
Arlington, Virginia
February 13, 2024

Day 1 Meeting Summary

TABLE OF CONTENTS

Day 1 Participants

Electricity Advisory Committee Members

SHARON ALLAN
Board Advisor & Consultant

CHRISTOPHER AYERS
North Carolina Utilities Commission

LAUREN AZAR
Azar Law, LLC

ANDREW BARBEAU
The Accelerate Group, LLC

TOM BIALEK
Toumetis
DANIEL BROOKS
Electric Power Research Institute

ROBERT W. CUMMINGS
Red Yucca Power Consulting

KIMBERLY DENBOW
American Gas Association

DREW FELLON
Alliance Advisory Services

LOUIS FINKEL
National Rural Electric Cooperative Association

LISA FRANTZIS
Guidehouse

PAULA R. GLOVER
Alliance to Save Energy

ALIYA HAQ
Breakthrough Energy

MISSY HENRICKSEN
Center for Energy Workforce Development

DAVE HERLONG
Florida Power and Light

MARIO HURTADO
Luma Energy, LLC

LYNNE KIESLING
Northwestern University

CLAY KOPLIN
Cordova Electric Cooperative

MONICA MARTINEZ
Ruben Strategy Group, LLC

SAMARA MOORE
Amazon Web Services

JAY MORRISON
ElectriCities of North Carolina, Inc.

RICHARD MROZ
Resolute Strategies, LLC

DON PARSONS
Georgia House of Representatives

DELIA PATTERSON
Salt Rivere Project

DARLENE PHILLIPS
PJM Interconnection, LLC

WANDA REDER
Grid-X Partners, LLC

PAUL STOCKTON
Paul N. Stockton, LLC

ERIK TAKAYESU
Monarch Energy Advisory, LLC

JON WELLINGHOFF
GridPolicy, Inc.

Registered U.S. Department of Energy (DOE), National Laboratories, and Power Marketing Administrations

BAHRAM BARAZESH
Office of Electricity, U.S. DOE

GIL BINDEWALD
Office of Electricity, U.S. DOE

SAMUEL BOCKENHAUER
Office of Electricity, U.S. DOE

JOHN BREWER
National Energy Technology Laboratory

CAITLIN CALLAGHAN
Office of Electricity, U.S. DOE

MELISSA CASTILLO GUTIERREZ
Office of Electricity, U.S. DOE

JAYNE FAITH
Office of Electricity, U.S. DOE

MILES FERNANDEZ
Office of Electricity, U.S. DOE

STEVE FOLGA
Argonne National Laboratory

ALI GHASSEMIAN
Office of Electricity, U.S. DOE

ERIC HSIEH
Office of Electricity, U.S. DOE

CHRIS IRWIN
Office of Electricity, U.S. DOE

SANDRA JENKINS
Office of Electricity, U.S. DOE

MOHAMED KAMALUDEEN
Office of Electricity, U.S. DOE

HAMDAAN KHAN
Office of Electricity, U.S. DOE

NYLA KHAN
Office of Electricity, U.S. DOE

COURTNEY LUCAS
Office of Electricity, U.S. DOE

KATHERINE MCLAUGHLIN
Office of Electricity, U.S. DOE

VARSHA MENON
Office of Electricity, U.S. DOE

MATT MESSENGER
National Energy Technology Laboratory

JORDAN MOREE
Office of Electricity, U.S. DOE

ROSHI NATEGHI
Office of Electricity, U.S. DOE

EMEKA OBIKWELU
Office of Electricity, U.S. DOE

JOSEPH PALADINO
Office of Electricity, U.S. DOE

FERNANDO PALMA
Office of Electricity, U.S. DOE

ANDRE PEREIRA
Office of Electricity, U.S. DOE

MICHAEL PESIN
Office of Electricity, U.S. DOE

GENE RODRIGUES
Office of Electricity, U.S. DOE

BENJAMIN SHRAGER
Office of Electricity, U.S. DOE

VINOD SIBERRY
Office of Electricity, U.S. DOE

MERRILL SMITH
Office of Electricity, U.S. DOE

VINCENT SPRENKLE
Pacific Northwest National Laboratory

MARY TOLER
Battelle National Laboratory

DAVID WELLS
Office of Electricity, U.S. DOE

MENG YUE
Brookhaven National Laboratory

Registered Speakers, Guests, and Members of the Public

MO ASHRAFI
AnalyticsRe

VENKAT BANUNARAYANAN
National Rural Electric Cooperative Association

NOLAN BRICKWOOD
Paul Hastings

JORDI BURBANO
Los Angeles Department of Water and Power

BEN CALKINS
ML Strategies

MAHILA CHRISTOPHER
Public Utilities Commission of Ohio

ABBY FRANCIS
ML Strategies

ALICINE FRANCOIS
Eversource Energy

MYRIA GARCIA
ML Strategies

SKYE HONAS
LCEC

JOHN HOWES
Redland Energy Group

DAVID HUFF
Federal Energy Regulatory Commission

HUIYI JACKSON
Edison Electric Institute

MICHAEL JEFFERSON
MISO

HENRY KENCHINGTON
Self

HEATHER LEASK
Entrust Solutions Group

MAURA McCLELLAND
PUCO

ROGER MIKSAD
Batter Council International

BENJAMIN NUSSDORF
National Propane Gas Association

MARK OLSON
North American Electric Reliability Corporation

BILL PFISTER
Edison Electric Institute

HEATHER POULZIN
Federal Energy Regulatory Commission

JAMES REILLY
Reilly Associates

ROLLIS REISNER
McWante, Inc.

JOE SOWELL
Georgia Transmission Corporation

PASCAL TESSIER
FuelCell Energy

JOEL TIBBET
Los Angeles Department of Water and Power

CYNDY WILSON
Self

DAVID WOJICK
Self

JAMES YOUNG
National Mining Association

JUNBO ZHAO
University of Connecticut

Technical Support Team

ISABEL BAND
Guidehouse

FERNANDO BOWEN
Sidem

BERTIE HAMILTON
Sidem

Meeting Overview

The Electricity Advisory Committee's (EAC) first meeting of 2024 was held February 13 and 14 using a hybrid format at the National Rural Electric Cooperative Association Conference Center in Arlington, Virginia, with the option of virtual participation via the video conferencing platform Webex. On the first day of the meeting, Gene Rodrigues, Assistant Secretary (AS) for the U.S. Department of Energy's (DOE) Office of Electricity (OE), provided introductory remarks. Dr. Roshi Nateghi, OE Program Manager, moderated a discussion on risk-informed decision making. Mark Olson, Manager of Reliability Assessments, North American Electric Reliability Corporation (NERC), presented findings from the most recent NERC Winter Reliability Assessment.

In the afternoon, a panel that included Sandy Jenkins, OE Director of Grid Controls; Dr. Ali Ghassemian, OE Acting Director of Grid Modeling; John Brewer, Research Engineer, National Energy Technology Laboratory (NETL); Heather Polzin, Reliability Enforcement Counsel, Federal Energy Regulatory Commission (FERC); and David Huff, Electrical Engineer, FERC, moderated a discussion on the interrelationship between gas and electric. Finally, OE Deputy Assistant Secretary Eric Hsieh, and Vince Sprenkle, Director of the Grid Storage Launchpad, Pacific Northwest National Laboratory, presented an update on the Grid Storage Launchpad.

All presentations can be found at Electricity Advisory Committee February 2024 Meeting | Department of Energy

Welcome, Call to Order, Introductions, and Developments Since the Last Meeting

Jayne Faith, EAC Designated Federal Officer, welcomed attendees, took attendance, covered several housekeeping items, and officially called the meeting to order. EAC Chair Wanda Reder outlined the agenda across both days. Wanda Reder added that the EAC had some recent changes in EAC leadership. The Energy Storage Subcommittee is now chaired by Jay Morrison, Andrew Barbeau has joined the Smart Grid Subcommittee leadership team, and Dave Herlong is a Co-Vice Chair for the Grid Resilience for National Security (GRNS) Subcommittee.

Update on the DOE Office of Electricity's Programs and Initiatives

Assistant Secretary Rodrigues said that he recently participated in a series of public engagements centered on collaborating to achieve measurable outcomes. He urged the EAC to continue to push to invest in the future rather than locking in past approaches to electricity management and he opened the floor for questions.

Discussion

Q. Paul Stockton asked Assistant Secretary Rodrigues to provide the EAC with priorities for grid transformation.

Assistant Secretary Rodrigues said that strategic intent should guide the grid transformation. Important pieces of this are:

- Strategic communications can help ensure that the public is aware of the investment and work needed to transform and maintain a resilient grid. This can help inform a more comprehensive transformation rather than one-off changes.
- Operating, planning, and investing should evolve with evolving conditions, and regulation should keep pace with innovation.
- The magnitude of the transformation underway necessitates evolution of the culture of the electricity industry. Assistant Secretary Rodrigues said that DOE and the EAC should work to evolve the way energy industry stakeholders view their role in ensuring reliability, resilience, security, and affordability through the grid transformation.

Q. Wanda Reder said that pilot projects, technology, and testing from national laboratories should be made available to educate the public and asked how DOE planned to scale their education efforts.

Assistant Secretary Rodrigues said that it is critical to recognize the diversity of needs, approaches and knowledge between states, territories, and populations. Educational efforts have to be flexible and provide information so that people can make informed choices, but cannot be didactic. He added that DOE and the EAC should think about pushing forward in areas where most people agree on approaches.

Q. Tom Bialek stated that generally, the public takes electricity for granted, and does not understand how it is generated. He cited the increasing use of automation and asked how DOE is considering related factors.

Assistant Secretary Rodrigues said the electricity industry can no longer manage solely through risk and has to develop the capability to manage operations through uncertainty and evolving risk conditions. Dr. Nateghi's presentation will discuss how risk can be understood and managed in the electricity industry. This approach requires flexibility and agility.

Q. Andrew Barbeau noted that explicit recommendations are useful for DOE. The EAC should focus on translating discussions into actionable recommendations.

Assistant Secretary Rodrigues said that resources and tools from OE must be co-created with industry stakeholders to incorporate real-world considerations. He told the EAC to make strong recommendations so OE can develop solutions.

Q. Kimberly Denbow cited the continued need for transformers and asked about OE's position regarding moving entirely to sources of electricity other than fossil fuels. She expressed concern regarding the lack of reliability presented by this approach.

Assistant Rodrigues said that to remain focused on reliability, resilience, security, and safety, OE recognizes that states will continue to use multiple forms of energy, including fossil fuels. He described efforts to ensure that we can integrate all forms of energy. Regarding supply chain challenges, he said that a working group comprised of manufacturers, power associations, the U.S. Department of Labor, the National Security Council, and the White House are making progress on identifying near-term solutions. A subgroup is focused on reducing the components that make up distribution transformers. OE released the Flexible Innovative Transformer Technologies (FITT) Funding Opportunity Announcement (FOA). Through this FOA, DOE will select up to nine awardees who are able to research, develop, and demonstrate advanced transformers across a range of distribution to transmission scale applications, improving grid reliability and easing transformer supply chain constraints.

OE Moderated Discussion on Risk-Informed Decision Making

Dr. Roshi Nateghi, OE Program Manager, provided a presentation on risk-informed decision-making. Her presentation slides can be found online via the link provided in the Meeting Overview section above.

Discussion

Robert Cummings stated that, when developing solutions, OE should include stakeholders such as the North American Electric Reliability Corporation and the Institute of Electrical and Electronics Engineers, PJM Interconnection, the American Public Power Association, and various utilities.

Sharon Allan mentioned that States and other entities should provide more accurate data and modeling and plans for keeping grid data clean before they receive federal funding.

Q. Clay Koplin said that one of the greatest tools a utility can deploy is flexibility. He asked how EAC members can task themselves to be more flexible and engage with others to understand their risks and motivations? This could enable collaboration.

Dr. Nateghi recognized that external sources of uncertainty are substantial. She noted that tools exist to facilitate these processes, but they have not been implemented.

Q. Lynne Kiesling differentiated between epistemic uncertainty (uncertainty that can reduce through mitigating actions) and true uncertainty (the underlying probability is unknown). She asked which tools can be applied in the face of uncertainty.

Dr. Nateghi replied that epistemic uncertainty represents areas of ignorance. People can actively learn in order to reduce epistemic uncertainty. A method to manage epistemic uncertainty is transparency about areas of uncertainty with decision makers.

Q. Lauren Azar said that the Federal Energy Regulatory Commission (FERC) will mandate that utilities use scenarios for long-term planning. However, it can be difficult to develop meaningful scenarios when faced with deep uncertainty. She encouraged OE to develop such scenarios that are robust and procedurally oriented.

Gil Bindewald said that OE can provide scenarios. OE is working on advanced modeling of scenario structures for planning that incorporate vulnerabilities, risk, and consequences. OE needs more active dialogue with the industry and other stakeholders to identify where scenarios would be relevant and to identify where the industry invests to integrate more flexibility.

Q. Tom Bialek noted that relevant scenarios can be difficult to identify, and OE should conduct outreach when developing scenarios to integrate real-world considerations rather than relying solely on experts.

Dr. Nateghi said that DOE could potentially play a role in catalyzing partnerships in this area. Scenarios can help utilities make more informed decisions even if they are not fully adopted. There needs to be more planning around uncertainty regarding natural resources.

Discussion: Daniel Brooks noted that some risk-based approaches that may be beneficial are not used because of the lack of skills and understanding needed to take and apply tools. If utilities cannot understand the underlying analytics for tools, they will not use the tools. It is important for DOE to communicate and explain the tools such that employees build capability to practically apply risk-based decision making.

Kimberly Denbow said that compliance verification and trust also present hurdles with risk-based approaches.

Q. Louis Finkel asked how DOE navigates deep-seated and intractable ideologies into developing risk-based approaches (e.g. an overarching objective is the restoration of power after an event and potentially not analysis of the incident itself).

Dr. Nateghi said that resilience and recovery are synonymous, with resilience taking precedent over recovering. Investments in the grid system impact restoration. OE is hoping to increase transparency and strategy in decision-making through these conversations.

Mario Hurtado said the stakeholder process is very important in developing and understanding complex methodologies and tools so that all stakeholders understand the tools.

Sharon Allan said that there is no common definition or set of metrics for resilience.

Dr. Nateghi said that there are more similarities than differences in resilience definitions across sectors, and measurable evidence exists. However, there are disincentives at the policy level to conduct risk-based analytics to reduce costs.

North American Energy Reliability Corporation Winter Reliability Assessment

- Mark Olson, Manager, Reliability Assessments, North American Electric Reliability Corporation (NERC)

Mark Olson presented NERC's findings from the most recent Winter Reliability Assessment and moderated a discussion on winter reliability. Mr. Olson's presentation slides can be found online via the link provided in the Meeting Overview section above.

Discussion

Q. Louis Finkel asked the extent to which NERC is examining the alignment of natural gas with the electricity market and whether policy changes will pose risks to reliability.

Mr. Olson said that NERC discusses the alignment between natural gas and electricity as part of their recommendation follow-up. NERC included recommendations in its Winter Reliability Assessment for policy makers. The underlying message to policy makers is that the resource mix should grow with the pace of change.

Q. Chris Ayers asked why increases in peaks occur in both the winter and the summer.

Mr. Olson said that NERC does not conduct forecasting, but does obtain and analyze industry data. Electrification of heating systems and industrialization are driving peaks.

Q. Kimberly Denbow said that as natural gas is removed from energy delivery, the electric side will experience added burden, particularly during the winter. She also asked whether NERC's reserve margins were based on capacity or demand margins.

Mr. Olson said that capacity was above forecasted peak demand and that NERC used a derated capacity margin.

Q. Mario Hurtado asked whether NERC is underestimating the positive impact of demand resources and how effective they can be for lowering risk.

Mr. Olson said that NERC considers demand respond in assessments and across methods.

Q. Delia Patterson said that it has been helpful for utilities to have NERC assessments, but NERC should communicate their assessments more widely.

Mr. Olson acknowledged that outreach is very important, and trade associations have helped to disseminate NERC assessments. He added that NERC assessments should be as understandable as possible to be educational.

Q. Darlene Phillips said that the procurement process with gas is inconsistent with strategies on the electric side which can present challenges. She asked how NERC is considering reliability changes in the future regarding the transition of resources.

Mr. Olson indicated that NERC's technical committees share best practices, and that reliability changes are part of other bodies of work.

Q. Drew Fellon asked:

- Whether NERC incorporates customer behavior at the residential and commercial levels in their modeling.
- Whether NERC conducts pipeline capacity reviews to understand challenges and where resources are needed.

Mr. Olson responded:

- NERC only includes customer behavior indirectly.

  NERC has not done a significant analysis in pipeline capacity, but recently recommended detailed studies in this area.

OE Moderated Discussion Regarding Interrelationship between Gas and Electric

Presenters:

- Sandy Jenkins, Director of Grid Controls, Office of Electricity, U.S. Department of Energy
- Dr. Ali Ghassemian, Acting Director of Grid Modeling, Office of Electricity, U.S. Department of Energy
- John Brewer, Research Engineer, National Energy Technology Laboratory (NETL), U.S. Department of Energy
- Heather Polzin, Reliability Enforcement Counsel to the Office of Enforcement, Federal Energy Regulatory Commission
- David Huff, Electrical Engineer, Office of Electric Reliability, Federal Energy Regulatory Commission

The panelists' presentation slides can be found online via the link provided in the Meeting Overview section above.

Discussion

Q. Andrew Barbeau noted that the northeast United States is at risk of being without heat as extreme winter events increase. He asked how to consider this increasing risk with other planning initiatives, and how such planning and mitigation would be funded.

Ms. Polzin said that regions assume that extreme events that took place elsewhere will not happen in their region, and they do not invest in mitigating measures.

Mr. Huff added that because many facilities are governed at the state level, it is critical to communicate and explain these findings to states.

Dr. Ghassemian conveyed that a risk model and data to populate the risk model is needed to manage the increasing risk posed by extreme weather events.

Q. Sharon Allan said that some utilities are planning early retirement of gas, and asked whether DOE is considering the impact of retiring gas on the system.

Mr. Brewer said that NETL uses a complex natural gas model that takes into account sectoral demands. NETL will incorporate changing conditions into the model.

Q. Erik Takayesu asked how extreme weather events might influence needs for engineering standards and planning criteria, and whether DOE is considering the pace at which this should take place.

Dr. Ghassemian said that OE is developing use cases based on trends over time that can be used by policymakers, states, and other stakeholders. Once validated, these use cases can serve as a starting point for identifying solutions.

Assistant Secretary Rodrigues said that use cases will be data-driven, and are intended to inform decision-making on a state-by-state basis.

Ms. Jenkins said that exemplar regions in gas-electric coordination can inform how other regions approach the issue.

Q. Daniel Brooks said that electric system conditions are becoming more extreme and unpredictable; models should incorporate complexity that reflects real-world system conditions. Given the emerging system complexities, added modeling capabilities such as defining and using the most vulnerable hour(s), added scenario planning, and greater temporal analysis is desired in addition to using traditional peak forecasting techniques as a basis.

Dr. Ghassemian said that OE continuously adds layers into models to address emerging system complexity.

Discussion: Kimberly Denbow said that the natural gas value chain is comprised of production, midstream, and downstream segments. She encouraged DOE to develop a process for collaboration and corrective actions that is based upon predictive and targeted analysis for these segments.

Lisa Frantzis encouraged DOE to continue to work with utilities on predictive modeling because utilities can provide granular data.

Rick Mroz noted that the EAC should work to identify recommendations for gas-electric coordination.

Jay Morrison noted three competing priorities:

- Stakeholders and policymakers are prioritizing reductions in carbon.
- Regarding winter reliability, gas is still important to delivery energy.
- Gas still needs investment during the grid transition.

Given the competing priorities, he questioned whether gas would receive sufficient funding to support reliability during the energy transition. The importance of road mapping and effective communications on the variables that impact reliability was discussed so sufficient reliability investments could be considered and assessed throughout journey.

OE Update on the Grid Storage Launchpad

- Deputy Assistant Secretary for Energy Storage, Eric Hsieh, Office of Electricity, U.S. Department of Energy
- Vince Sprenkle, Director, Grid Storage Launchpad, Pacific Northwest National Laboratory

Deputy Assistant Secretary Hsieh and Vince Sprenkle updated the EAC on the Grid Storage Launchpad. Their presentation slides can be found online via the link provided in the Meeting Overview section above.

Discussion

Q. Andrew Barbeau asked what duty cycle OE runs.

Mr. Sprenkle said that OE runs a standard duty cycle and a more energy intensive one. Mr. Sprenkle said that the public reaches out to the Grid Storage Launchpad (GSL) directly, and OE matches needs to GSL capabilities.

Q. Sharon Allan noted that if testing results are published, startups or new entrants may not be able to financially recover from perceived negative results in testing. She also asked how the GSL will be funded for the long-term.

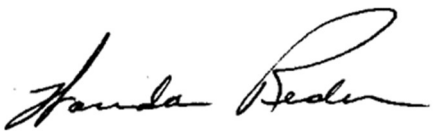
Mr. Sprenkle said that OE would likely note potential problems as part of the DOE proposal to participate in the GSL, and any corrective actions during testing depend on the device. Launchpad participants have the first access to information depending on how the testing is funded. GSL employees came from other Federal offices or national laboratories, so the GSL is partially federally funded.

Wrap-Up and Adjournment of Day 1 of the February 2024 EAC Meeting

Ms. Reder thanked everyone for their contributions and noted the start time for Day 2 of the EAC Meeting.

Signature Page

Respectfully Submitted and Certified as Accurate,



04/25/24

Wanda Reder
Grid-X Partners, LLC
Chair
DOE Electricity Advisory Committee

Date

04/25/24

Clay Koplin
Cordova Electric
Vice-Chair
DOE Electricity Advisory Committee

Date

04/25/24

Jayne Faith
Office of Electricity
Designated Federal Officer
DOE Electricity Advisory Committee

Date