U.S. Department of Energy
Electricity Advisory Committee Meeting

National Rural Electric Cooperative Association Conference Center

Arlington, Virginia

October 18, 2023

Day 2 Meeting Summary

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Day 2 Participants

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Meeting Overview

The Electricity Advisory Committee's (EAC) fourth meeting of 2023 was held on October 17 and 18 using a hybrid format at the National Rural Electric Cooperative Association building in Arlington, Virginia, with the option of virtual participation via the video conferencing platform Webex. On the second day of the meeting, Mohamed Kamaludeen, Director of Storage and Validation in the U.S. Department of Energy's (DOE) Office of Electricity (OE), provided an update on DOE's Energy Storage Grand Challenge and led a discussion on energy storage. Next, EAC member and Smart Grid Subcommittee Chair Tom Bialek provided an update on subcommittee activities and planned work efforts. As part of the same agenda item, EAC member and Smart Grid Subcommittee Vice Chair Darlene Phillips presented the updates made to the EAC recommendations to DOE, entitled "Urgent Needs to Reliably Facilitate the Energy Transition." The EAC voted and unanimously approved the recommendations. Eric Rollison, Assistant Director for Risk Analysis, Resilience, and Recovery in DOE's Office of Cybersecurity, Energy Security, and Emergency Response (CESER) provided an update on CESER-related activities. Next, the Energy Storage Subcommittee and Grid Resilience for National Security Subcommittee Vice Chair and Chair, respectively, provided updates on subcommittee activities and work products. The meeting concluded with further discussion on reliability and actions that DOE could take.

All presentations, as well as recordings of the meeting, can be found at https://www.energy.gov/oe/october-17-18-2023-electricity-advisory-committee-meeting.

Day 2 Opening Remarks

Jayne Faith, EAC Designated Federal Officer, welcomed attendees, took attendance, and officially called the meeting to order. EAC Chair Wanda Reder outlined the agenda and introduced the first speaker.

OE Moderated Discussion on Energy Storage

Dr. Mohamed Kamaludeen provided an update on DOE's Energy Storage Grand Challenge. His presentation slides can be found on the meeting's webpage (see the Meeting Overview section above).

Discussion

Dr. Kamaludeen invited discussion on which services DOE should focus on as they relate to unlocking the value of energy storage as a grid asset. Assistant Secretary (AS) Rodrigues invited

guidance from the EAC on specific lines of research that OE could conduct which would be impactful.

Darlene Phillips referenced PJM Interconnection's stakeholder process to introduce storage as a transmission asset, which was not approved because all operational aspects had not been resolved (e.g., When do operators and dispatchers call on storage resources?, How are the asset owners compensated?). Ms. Phillips said it would be useful for DOE to provide analysis on the role of storage in voltage support.

Bob Cummings noted that storage can provide stabilization to the grid.

Rick Mroz noted there is no central transmission planning authority and said that DOE can use its convening power to increase alignment among planning entities.

AS Rodrigues said OE can play a major role in regional engagement; however, it must be welcomed by the stakeholders involved.

Jon Wellinghoff and Mr. Mroz said the Independent System Operator / Regional Transmission Organization Council (IRC) and the Organization of PJM States, Inc. are good examples of entities with whom OE could engage.

Mario Hurtado asked at what point decisions are made that lock in the use of devices, noting that these decisions limit flexibility.

Dr. Kamaludeen noted that establishing a use case upfront is critical to the overall cause of energy storage assets because the system is designed to meet those use cases. It would be beneficial to build more flexibility into performance contracts to allow systems to be retrofitted.

Clay Koplin added that additional use cases for energy storage assets (e.g., blackstart) can require retrofits.

Dr. Kamaludeen suggested that it might be a good idea to have a baseline set of use cases for storage as a transmission asset (SATA) and storage as a transmission-only asset (SATOA).

Mr. Cummings said that it would be important to distinguish between essential and ancillary reliability services.

Tom Bialek noted the challenges involved with aggregating storage assets because they can be at varying levels of charge or discharge.

Andrew Barbeau said that the EAC's 2022 Biennial Energy Storage Review found a significant lack of compensation for the services and value provided by energy storage assets. Large gaps associated with transmission and distribution upgrade deferral exist, as well as planning and providing for flexibility while transmission is being built. On the distribution side, there is a gap in understanding with regard to the value provided by services such as blackstart capability and

voltage control. The value provided by some services may be too small to merit the development of markets. On the customer side, time of use rates, demand reduction, and backup for resilience are well understood and there are DOE tools to support planning and analysis. Another gap is in capturing the value of long-duration energy storage.

Dr. Kamaludeen said it could be helpful for DOE to gather in one publicly accessible place its analysis tools related to the value of energy storage on the transmission system.

Dr. Kamaludeen invited EAC input on how to assign quantifiable value to services such as voltage support and operations and maintenance savings.

Drew Fellon said that partnering arrangements between industrial customers and their utilities would be beneficial as related to placing solar arrays, installing storage assets, and achieving decarbonization goals.

Howard Gugel requested that any baseline set of use cases for SATA or SATOA include the stipulation that energy storage assets not be installed with grid-following technology. He also said that the rapid increase in inverter-based resources is creating a situation where load current and fault current are of almost the same magnitude, which results in the limited availability of fault current on the system. It would be valuable to explore how energy storage can contribute to providing fault current in certain scenarios because that would help protect the transmission system.

Dr. Bialek said one of the major challenges with aggregating energy storage at the distribution level and providing it to wholesale markets is data sharing and data security. Another challenge is identifying the requirements that should be applied to aggregated resources and how similar those requirements should be to those for large generators.

AS Rodrigues asked whether there should be consideration of the different types of procurements and contractual arrangements for different energy storage services and offerings. For example, the services provided by distributed storage in the form of electric vehicles compared with large, stationary battery storage assets may call for differing arrangements.

Dr. Bialek said that aggregators may not want to be subject to certain requirements (e.g., metering); however, this may result in not being compensated the same as for the other generation sources.

Dr. Kamaludeen added that providing data in an appropriate timeframe is a relevant issue.

Regarding long-term planning as it relates to energy storage, Lauren Azar said current models for regional and interregional design and planning do not model storage well. She suggested DOE could contribute to improving how these models include storage.

Mr. Mroz said stakeholders will need to internalize the fact that energy storage resources will cost more and so it will be important to identify the attributes, benefits, and avoided costs

associated with storage. There are currently no tools and models that easily quantify and present the additional benefits and cost savings.

Lisa Frantzis emphasized the importance of DOE's convening role to help define and codify the value streams provided by energy storage and distributed energy resources more broadly. She encouraged OE to contact organizations such as Advanced Energy Economy, which have already been working with utilities to help define the value streams.

Mr. Cummings emphasized that all aggregation and dispatch must operate according to security constraints and these constraints affect the valuation of the aggregated assets.

Erik Takayesu said the challenge with long-term planning is that it takes place in the context of the currently available technology. In California, traditional solutions are more cost-effective than today's storage solutions. He added that siting is extraordinarily difficult. There will also need to be adequate situational awareness regarding the distribution system to ensure that storage capacity is available when needed.

Dr. Kamaludeen asked EAC members whether energy storage should be subject to benefit-cost analysis (BCA) or whether it should be treated like other assets and infrastructure (e.g., a substation) that are deemed necessary and thus exempt from BCA.

Wanda Reder replied that as the grid transitions and evolves, the definition of what is considered necessary or needed should be examined because it has typically been defined based on historical trends. However, an updated concept or definition should be more forward-looking.

Smart Grid Subcommittee Update

Dr. Bialek, the subcommittee Chair, thanked EAC members for their feedback on the Reliability work product and noted that the final document does incorporate significant comments from EAC members. Ms. Phillips gave an overview of minor edits that had been made based on the discussion that took place on Day 1. Jayne Faith took a roll call vote. The work product unanimously passed. AS Rodrigues thanked the EAC for their collaboration on the work product. Dr. Bialek presented topics under consideration for future working group activities.

Update on CESER Related Activities

Eric Rollison, Assistant Director for Risk Analysis, Resilience, and Recovery at CESER, presented updates to the EAC on CESER's programmatic activities. His presentation slides can be found on the meeting's webpage (see the Meeting Overview section above).

Discussion

Dr. Bialek asked how important secure data platforms are given the dependencies on different types of infrastructure and questions related to where data are stored and who has access to data. Mr. Rollison responded that the current question was about striking a balance between transparency and security and that CESER is supporting work on this topic with the National Association of Regulatory Utility Commissioners (NARUC) and other stakeholders. Mr. Koplin noted that secure independent grids rely more on cloud-hosted servers and data, which may be less secure. Mr. Rollison confirmed that CESER is looking into the security of cloud services and coordination with cloud service providers.

Mr. Barbeau asked whether CESER is looking into the effects of the duration of outages on infrastructure. Mr. Rollison stated that the Department, as a whole, is looking into the timing perspective on outages and how to communicate resiliency information to stakeholders.

Gil Bindewald, OE Principal Deputy Assistant Secretary, asked Mr. Rollison to frame CESER's growth and work in terms of how he sees CESER investing itself as an organization to address these issues. Mr. Rollison stated that CESER is building out a larger response to incident support function internally and a preparedness policy and risk analysis function. Mr. Rollison stated that CESER is focusing on building out products and services of an enduring nature that can be leveraged during both steady-state and incident response situations.

Mr. Mroz commented that he is a member of the Baseline Task Force under NARUC and that by the end of the year, the taskforce aims to release recommendations on a set of standards for cybersecurity for public utilities and states.

Dr. Bialek commented on the importance of the supply chain and asked how CESER might inform manufacturers about the importance of cybersecurity. Mr. Rollison stated that CESER is pushing the concept of cybersecurity by design, emphasizing cybersecurity as a core component of the design process. He stated that CESER is seeking to engage manufacturers in CESER processes to help them understand where threats come from and how they can design products with security in mind.

Jon Wellinghoff asked whether DOE is working on physical security in addition to cybersecurity. Mr. Rollison stated that DOE is supporting the Federal Energy Regulatory Commission's (FERC) work reviewing physical security standards and has participated in ongoing technical conferences and road show presentations for owners and operators. Physical security is part of the ongoing discussion with state regulatory bodies and was the focus of a recent request for information. Mr. Wellinghoff asked whether CESER had specifically thought about implementing baseline recommendations for physical security as they do for cybersecurity. Mr. Rollison stated that this suggestion would be taken under advisement.

Brian Lipscomb asked about work related to assessing the risk of continual opposition to transmission infrastructure improvement. Mr. Rollison stated that DOE is evaluating that risk in a long-term sense; however, CESER is not directly involved.

Mr. Hurtado asked Mr. Rollison to speak more about work on tightly coupled versus loosely coupled communications and whether CESER has guidelines on data sharing with stakeholders. Mr. Rollison stated that there is no formal publication on tightly coupled communications; however, CESER has been thinking about how to provide guidance for systems operation that is not regulatory. Mr. Rollison stated that CESER and NARUC have been working on outlining what data are collected for regulatory purposes and what data are absolutely needed. He noted that a large amount of data might be collected when only a small fraction of that data is needed for systems operation, and that data would be most pertinent to share with stakeholders.

Mr. Cummings stated that facilities such as those for offshore wind are susceptible to attack and asked whether DOE has plans for how to replace the capacity lost in case of a "single point of failure" attack. Mr. Rollison stated that a U.S. Government Accountability Office audit earlier this year reviewed the regulation of offshore wind. He stated that CESER has been working with the National Security Council, the U.S. Coast Guard, and the Bureau of Safety and Environmental Enforcement to think through the physical security of offshore wind facilities and planning for risks with owners and operators.

Daniel Brooks asked about the intersection between CESER's and OE's work on risk analytics and how that relates to the EAC's scope. Mr. Rollison responded that he works closely and in coordination with OE and CESER focuses on long-term situational planning that can inform OE's work in developing tools and technologies. Mr. Bindewald added that CESER focuses on risk and scenario preconditions, while OE brings in domain understanding of evolving contexts.

Energy Storage Subcommittee Update

Mr. Koplin, the Energy Storage Subcommittee Vice Chair, gave a brief overview of the subcommittee's work areas and responsibilities. He recapped recent work products, including the EAC's response to the Energy Storage Grand Challenge Request for Information (February–October 2020), the Five-Year Energy Storage Program Review (January–March 2021), and the Biennial Energy Storage Review (June 2022 – February 2023). Upcoming work products include the 2024 Biennial Energy Storage Review and the 2026 Five-Year Energy Storage Program Review. Mr. Koplin listed a few potential work products that have been discussed in the subcommittee for the coming months, covering topics such as an evaluation of electric vehicles as a grid storage asset, a status update on the Energy Storage Grand Challenge, an update on a past presentation from the Boston fire chief on placement of battery energy storage in urban areas, and an update on the status of long-duration energy storage.

Grid Resilience for National Security Subcommittee Update

Paul Stockton, Grid Resilience for National Security (GRNS) Subcommittee Chair, thanked AS Rodrigues for the guidance memo he provided to the GRNS Subcommittee and expressed support for the specific opportunities for analysis that AS Rodrigues identified. He introduced additional lines of effort raised by subcommittee members, including the use of inverter-based resources (IBRs) for blackstart, opportunities to strengthen partnerships between industrial players and utilities for the deployment of IBRs, and new opportunities that the deployment of IBRs present for pre-planned power islanding. AS Rodrigues thanked the subcommittee and stated he is looking forward to their insights and also noted that this will be the process moving forward. Dr. Stockton added that another line of effort suggested by subcommittee member Drew Fellon was to consider the supply chain as a potential risk to security and buildout of the green grid.

Public Comments

There were no public comments.

Concluding Remarks

Wanda Reder emphasized the need for urgent and multi-pronged actions on reliability issues. She expressed appreciation that all EAC members gave input on and approved the reliability work product. She noted that the EAC and DOE should think about what actions may follow, noting that DOE might use the power of convening to bring NARUC, FERC, and other stakeholders to the table. Ms. Reder expressed appreciation for the dialogue and format of the OE Moderated Discussion on Reliability (Day 1) and the Energy Storage Moderated Discussion (Day 2) because she thought that the format allowed for productive and efficient engagement. Ms. Reder noted that discussion on both days seemed to center around transmission and "big systems" thinking and urged that members also think about the distribution side. She stated that upcoming EAC obligations include the Smart Grid Systems Report and the 2024 Biennial Energy Storage Review.

Mr. Koplin thanked Ms. Phillips for her work on the reliability work product and encouraged interested EAC members to participate on the Energy Storage Subcommittee. He stressed the importance of attendance at subcommittee meetings.

AS Rodrigues thanked Ms. Reder for her leadership and the EAC members for their engagement. He stated that OE will continue with the type of engagement seen at this meeting.

Dr. Bialek noted that the current transition presents an opportunity to think about what load profile is desired. He also stated that facilities can be mothballed rather than demolished so that

they can be used again in the future if needed. AS Rodrigues expanded on Dr. Bialek's first point and stated that the transition is really a moment of transformation in affordability, asset utilization, and many other aspects.

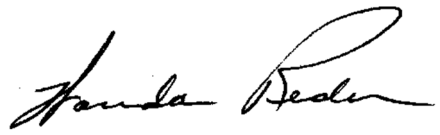
Dr. Stockton thanked Ms. Faith for her efforts.

Mr. Hurtado noted that the NARUC Winter Policy Forum will take place February 25–28, 2024, and the upcoming EAC meeting could be coordinated with that event. Lynne Kiesling concurred. Mr. Brooks stated that DISTRIBUTECH International 2024 would also take place the last week of February 2024.

Ms. Reder called the meeting to a close.

Signature Page

Respectfully Submitted and Certified as Accurate,



Wanda Reder
Chair
U.S. Department of Energy Electricity Advisory Committee

December 27, 2023
Date

Clay Koplin
Vice Chair
U.S. Department of Energy Electricity Advisory Committee

December 27, 2023
Date

Jayne Faith
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December 27, 2023
Date