U.S. Department of Energy

Electricity Advisory Committee Meeting

Hosted Virtually Via WebEx

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Meeting Summary

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Meeting Summary

This was the first Electricity Advisory Committee (EAC) meeting of 2021 and was held virtually given the COVID-19 pandemic. On the first day of the meeting, Acting Assistant Secretary Patricia Hoffman, U.S. Department of Energy's (DOE) Office of Electricity (OE), provided comments about her takeaways from Governor Jennifer Granholm's Secretarial nomination hearing. Ms. Hoffman spoke about how she sees OE playing a role in the new administration. The rest of the day was centered around the Federal Energy Regulatory Commission's (FERC) recent Order 2222. Dr. David Kathan, FERC, gave an overview of the order by discussing how it came to be, its intentions, and future steps. His presentation was followed by two panel sessions of "Aggregated DER Participation in ISO/RTO Markets Enabled by FERC Order 2222." The first session consisted of the independent system operator (ISO)/regional transmission organization (RTO) perspective and the second session consisted of utilities. The day concluded with a roundtable discussion among EAC members, the panelists, and DOE about the implications of implementing FERC Order 2222.

All presentations, as well as recordings from this meeting, can be found at https://www.energy.gov/oe/february-3-4-2021-meeting-electricity-advisory-committee

Welcome, Introductions, and Developments Since the October 2020 Meeting

Christopher Lawrence, EAC Designated Federal Officer, introduced himself and discussed some housekeeping items. The EAC members introduced themselves. Mr. Lawrence then officially called the meeting to order. Wanda Reder, Grid-X Partners, outlined the agenda across both days. Ms. Reder then invited Acting Assistant Secretary Hoffman to provide an update on OE programs and initiatives.

Update on Office of Electricity Programs and Initiatives

Acting Assistant Secretary Hoffman began by expressing appreciation for the EAC. She spoke about her takeaways from Governor Jennifer Granholm's Secretarial nomination hearing, which comprised continued electrification, future generation mix integrating mass-scale renewables, the path to decarbonization, and the emerging role of energy storage.

Ms. Hoffman acknowledged that OE has no directional change and is waiting for political appointees to be confirmed. She discussed the role she believes OE will play in the new administration. Energy storage will continue to have a strong role, specifically under the need to balance long-term duration with short-term power. Cybersecurity will continue to be a central focus. Ms. Hoffman expressed her excitement about the Big Data Analytics recommendations because she sees data modeling and analytics as one of the most valuable resources moving forward. She noted that data will play a versatile role across the industry.

Ms. Hoffman mentioned issues and challenges facing the industry. She highlighted resource adequacy, specifically through the lens of wildfire mitigation. Ms. Hoffman spoke of the importance of ensuring that the grid is flexible, especially with mass distributed energy resource (DER) integration coming online. She concluded by noting that there will be a natural learning curve since the new administration is currently onboarding.

Questions and Answers

Q1. Tom Bialek, San Diego Gas & Electric Company, asked Acting Assistant Secretary Hoffman if she has considered the role that DOE can play in shaping conversations about resource adequacy.

Ms. Hoffman replied that DOE has a role in making people understand the nuances of how generation occurs and how different forms of energy can be utilized. She spoke about the differences that need to occur regarding firm generation, flexible generation, and variable generation and how they can be integrated into the grid.

Q2. Mladen Kezunovic, Texas A&M University, asked how DOE addresses and measures resilience.

Acting Assistant Secretary Hoffman noted that this is an ongoing conversation that has been continually evolving over several years. She said that resilience is the ability to prepare, mitigate, respond, and recover from any given event (natural or man-made). Ms. Hoffman said that a hard part is valuing or quantifying resilient investment. She would like to see tailored approaches to different regions because there are no "one size fits all" solutions. Ms. Hoffman believes that resiliency adds to efficiency, that way the most effective practice will be used in each circumstance. She emphasized the importance of regional coordination.

Q3. Mike Heyeck, The Grid Group, commented about the missing piece of the conversation regarding fuel transformation.

Acting Assistant Secretary Hoffman replied that fuels, in general, need to be looked at for energy storage (e.g., electric, thermal, other fuel compositions). She said that this theme will continue to be part of the conversation.

Q4. Bob Cummings, Red Yucca Power Consulting, commented that storms are becoming capacity events, rather than just being distribution events. He also noted that with coal/fossil fuel generation facilities being taken down, there is a growing gap between supply and potential demand. This is because electric energy storage technology has not kept up with generation retirements.

Acting Assistant Secretary Hoffman agreed with these comments and said that those issues will be a central point of conversation. She said that policymakers must understand the implications of their policies.

Q5. Kimberly Denbow, American Gas Association, emphasized the need for DOE to pursue a diversified energy portfolio, especially at the beginning of the new administration.

Acting Assistant Secretary Hoffman agreed about the importance of taking a wholistic approach regarding energy generation. She said that this will be an evolving conversation that will play a significant role at the local levels to properly address resilience.

Q6. Wanda Reder, Grid-X Partners, asked Acting Assistant Secretary Hoffman about electrification and whether there are any priorities she would like the EAC to address in the coming year.

Ms. Hoffman replied that there is nothing definitive at this time. Overall, she thinks that the electrification of vehicles, large-scale transportation systems, building integration, and industrial application will be priority topics within the administration. Electrification of the economy will lead to

complex issues regarding generation and overall grid integration. This will add a dynamic relationship among the generation, transmission, and distribution aspects of the energy sector.

Overview of FERC Order 2222

Dr. David Kathan, FERC, began by reviewing a timeline of events leading up to the issuance of FERC Order 2222 and a roadmap for the future. He provided background on how FERC Order 2222 came to be created and a summary of the order. Dr. Kathan highlighted the definition of a "distributed energy resource" as any resource located on the distribution system, any subsystem thereof, or behind a customer meter. A "DER aggregator" is defined as the entity that aggregates one or more DERs for the purposes of participation in the capacity, energy, and/or ancillary service markets of the ISOs and/or RTOs. It was clarified that the DER aggregator is the ISO/RTO market participant, not the DER itself.

Dr. Kathan reviewed FERC's jurisdiction and how they came to their findings. He spoke about key provisions in FERC Order 2222. The DER aggregator is the single point of ISO/RTO contact, and it is responsible for managing, dispatching, metering, and settling the individual resources. Dr. Kathan noted the importance of allowing heterogeneous aggregations. The minimum size requirement for DERs is 100 kilowatts; however, the rule does not adopt a maximum size for a DER aggregation. Additionally, the rule does not adopt a minimum or maximum size of resources that can participate in an aggregation; however, each ISO/RTO must propose a maximum size for individual DERs. Each ISO/RTO must propose locational requirements that are as "as geographically broad as technically feasible," which may include multi-node aggregations. ISOs/RTOs must allow dual participation in retail programs and allow DERs to provide multiple wholesale services. They may create accounting/operational rules to avoid double payment. Dr. Kathan concluded by speaking about coordination requirements for ISOs/RTOs.

Questions and Answers

Q1. Flora Flygt, American Transmission Company (Ret.), asked how much conversation there was in the development of FERC Order 2222 about the roles of distribution utilities in this construct.

Dr. David Kathan said that the role of distribution facilities has been part of the conversation since 2016, and they have a crucial role. He referenced California and New York ISOs as entities that have collaborated with regard to making their own rules.

Q2. Sharon Allan, Smart Electric Power Alliance, asked whether a standardization document has been created entailing use cases, data elements, and what communications mechanisms would look like.

Dr. Kathan said that these approaches are being created. He mentioned some of the initiatives that the Electric Power Research Institute and the California Independent System Operator are working on.

Q3. Bob Cummings, Red Yucca Power Consulting, commented about an Institute of Electrical and Electronics Engineers' effort addressing data standardization. He asked whether balancing authority was considered while drafting FERC Order 2222.

Dr. Kathan clarified that FERC wrote the order in the context that the ISO/RTO is the balancing authority.

Aggregated DER Participation in ISO/RTO Markets Enabled by FERC Order 2222 – ISO/RTO Perspectives

Paul Kjellander, Idaho Public Utilities Commission, feels that the order slightly encroaches on the jurisdiction given to state regulators per the Federal Power Act. He emphasized that state regulators acknowledge the need to act regarding the mass DER integration with the electric grid. He relayed the message that state regulators' main concern is that the state's legitimate right to play its role in the discussion is kept intact. Mr. Kjellander spoke about state regulators' specific roles and responsibilities, and how they differ from other stakeholders.

Speaking to the content of the order itself, Mr. Kjellander has a positive view of the order and agreed with the technical aspects. He said that it was helpful to see clarity about FERC's definition of terms, such as DER. Mr. Kjellander brought up two areas of concern (opt-out and double-counting) and outlined the issues he sees them resulting in. One of his key takeaways is that the National Association of Regulatory Utility Commissioners (NARUC) needs to do better outreach to their federal counterparts and engage with constant cooperative federalism. Mr. Kjellander concluded with a message that even though the utilities he regulates (Idaho) do not participate in ISOs/RTOs, they are moving toward this direction.

Jill Powers, California Independent System Operator (CAISO), said that the purpose of her presentation is to give a foundational view of current participation models that CAISO has in place to facilitate DER access. CAISO has three main categories of supply models used for resource capabilities to provide wholesale market services: (1) load reduction (demand response), (2) generation (participating generator), and (3) load reduction with generation (non-generating resources). Ms. Powers walked through a comparison of these three models, outlining their attributes under different rules and regulations.

Ms. Powers discussed additional DER aggregation participation requirements to participate in a CAISO program. She noted that there are currently no DER aggregations participating in CAISO's DER provider provision program. Ms. Powers spoke about the connection between FERC Order 2222 and CAISO's 2016 Distributed Energy Resource Provider filing (FERC Order 2222 is largely based on this filing). She highlighted DER aggregator challenges to wholesale market participation. The ISO and distribution utilities formed a working group to address DER aggregator market participation. Ms. Powers concluded by listing a few other initiatives that CAISO is working on.

Questions and Answers

Q1. Flora Flygt, American Transmission Company (Ret.), asked for clarification about the meaning of "NRI".

NRI stands for Caiso's New Resource Implementation process.

Q2. Wanda Reder, Grid-X Partners, asked Jill Powers to further discuss communication and system requirements for coordination among the ISO, distributers, and aggregators.

Ms. Powers first spoke about the working group addressing this. She emphasized that if a DER aggregator were to bring in a new aggregator participant, there would be the use of current market reporting mechanisms. CAISO found that there are some reporting mechanisms that can be targeted

toward DERs. Ms. Powers clarified that they are looking to increase standardized, meaningful, and automated communications between transmission and distribution systems.

Danielle Croop, PJM Interconnection, said that PJM expects to see broad impacts on market participation by DERs. She highlighted that PJM has a robust demand response model and PJM will work with stakeholders and members in complying with FERC Order 2222. She indicated that a major challenge is maneuvering the collaboration paradigm among RTOs, utilities, and states. Ms. Croop spoke about steps that PJM is taking to prepare and enact the central themes in the previous sentence. Another major area that PJM is looking at is balancing priorities to ensure that participation models allow for the participation of aggregators while also ensuring reliability. These priorities are composed of ensuring the safety and reliability of T/D systems, locality requirements, and size requirements for participation. Ms. Croop spoke about how these three factors work together. She highlighted PJM's nodal dispatch, noting the important role it plays in both of the T/D layers. Nodal dispatch is the key piece in tying together all three of the factors mentioned above. Ms. Croop said that it is their biggest effort and challenge in coordination with utilities for T/D operation.

Aggregated DER Participation in ISO/RTO Markets Enabled by FERC Order 2222 – Utility Perspective

Tony Johnson, Southern California Edison (SCE), began the presentation by giving context that, in 2015, SCE had to begin replacing their distribution management system and how that shaped their distributed energy resources management system (DERMS) integration initiative. In 2016, SCE decided to have the initial connection for behind-the-meter DERs be through an aggregator, while also allowing for a direct connection to DERMS or supervisory control and data acquisition (SCADA). A question that SCE is addressing is how to communicate the data from the DER fleet management system to aggregators. Mr. Johnson spoke about how different DERMS systems can be utilized and play a role in the overall grid.

Questions and Answers

Q1. Mladen Kezunovic, Texas A&M University, asked about the role of DERMS in the resilience use service (outage management).

Tony Johnson replied they are starting to look at this for the operational power flow of distribution. Specifically, if they start changing the normal configuration of the circuit, then how can DER be used to mitigate customers that would have to be re-energized due to abnormal grid functions. He mentioned that their system does not necessarily forecast outages. The system is updated every 15 minutes, so they ultimately have a reactive system.

Q2. Daniel Brooks, Electric Power Research Institute, asked whether the distribution OPF capability is currently online.

Tony Johnson replied that these functions are not currently deployed, they are still in the testing phase. He said to expect a timeline of 2 to 3 years until this capability is fully deployed. Mr. Johnson said that this distribution OPF would help aggregators forecast what they can deliver based on grid conditions.

Joe Woomer, Dominion Energy, began by describing the complexities of the looming "future grid." He brought up the idea of needing reserves for DERs in each aggregated group. Mr. Woomer spoke about the implications of FERC Order 2222 by going through a rundown of current capabilities, gaps and challenges, and projects in process to better address FERC Order 2222.

Questions and Answers

Q1. Rick Mroz, Resolute Strategies, asked Joe Woomer to speak about stakeholder participation, specifically oversight of the intersection between state commissions and the distribution network.

Mr. Woomer replied that his chart is meant to show day-to-day operations, so he did not mean to exclude the states. He emphasized the important role of states and state commissions.

Q2. Mladen Kezunovic, Texas A&M University, asked about the need to deploy synchrophasors in the distribution system.

Joe Woomer replied that he foresees a migration of telemetry to the distribution system. Dominion Energy is at the beginning phase of adding sensors to this system.

Tony Johnson said that they would be implemented on a localized level.

Jeff Dennis, Advanced Energy Economy (AEE), began by providing an overview of AEE. Mr. Dennis reviewed why he believes that DER participation in wholesale markets is valuable. He said that it helps lower overall system costs, improves flexibility and reliability, ensures the market efficiency of just and reasonable rates as DER adoption rapidly increases, supports state policy goals, promotes greater integration of retail and wholesale markets, and clarifies state-federal jurisdiction.

Mr. Dennis discussed feedback that he has received from DER developers, owners, and aggregators about what they are looking for in ISO/RTO participation models. He relayed the main themes, including a clear roadmap for aggregated DERs to provide all the services they are capable of providing, aggregator demand response needs to be comparable to generators and stand-alone demand response functions, and harmonization of retail-level use cases with wholesale market participation.

Mr. Dennis concluded by addressing the challenges associated with implementing FERC Order 2222 thus far. These challenges entailed resolving issues with dual participation in retail and wholesale markets; establishing appropriate metering, telemetry, and data requirements and options; and clarifying interconnection requirements for DERs participating in wholesale aggregations.

Question and Answer

Q1. Tom Bialek, San Diego Gas & Electric Company, asked what he sees as a major impediment to aggregator participation.

Jeff Dennis replied that aggregators most need the ability to inject to expand their resources. The other main area to address is sorting out dual participation in the scope of the prohibition on double-counting.

Open Discussion Among Members Regarding the FERC Order 2222 Panels and Next Steps

Q1. Rick Mroz, Resolute Strategies, asked for suggestions about how enhanced planning efforts across a wide array of stakeholders can unfold.

Joe Woomer spoke about some of the work that Dominion Energy has done with the National Laboratories. He said that the focus should be on ensuring grid availability for resources to get back to the market. Mr. Woomer noted the importance of outlining cost-benefit analysis for state regulators.

Jeff Dennis said that utilities have an expressed interest in determining how to make the distribution system allow for direct sales to the wholesale market. He reiterated Mr. Woomer's points. Mr. Dennis spoke about the importance of highlighting success stories to share across the country.

Q2. Daniel Brooks, Electric Power Research Institute, asked about the extent to which aggregators are being engaged to provide a representation of aggregation capabilities.

Jeff Dennis said that Advanced Energy Economy is working with their members to develop resources that would display these capabilities.

Q3. Tom Bialek, San Diego Gas & Electric Company, asked whether the panelists' organizations have considered "feasible options perspectives" from a value staking perspective.

Tony Johnson replied that they are reassessing customer participation because the incentives and programs currently in place are not leading to participation.

Joe Woomer agreed with Mr. Johnson and added that they are also undergoing this same process. He said that the distribution grid was not created with current visions in mind, so utilities, RTOs, and ISOs are in the midst of transforming the grid.

Q4. Tom Weaver, American Electric Power Company, asked about how the addition of aggregators to the grid would impact overall DER and distribution investment to the grid.

Tony Johnson said that SCE has investigated utilizing energy storage as a mechanism for line upgrades and infrastructure changes. He believes that participation in the market, overall, benefits grid flexibility.

Q5. Wanda Reder, Grid-X Partners, asked about where aggregators fit in regarding the flow of information.

Jill Powers said that, for CAISO, they worked with utilities. CAISO tries to stay away from an interconnection process for DER aggregation. Ms. Powers said that they took this as a review process to go through several scenarios to ensure reliability, and it was well taken across utilities.

Tom Bialek added that utilities are in uncharted territory because aggregation is all new.

Tony Johnson replied that SCE is looking to tight coupling among DERMS, forecasting, and steady modes to provide this information to aggregators within 24 hours. Better coordination will help with their near real-time planning.

Joe Woomer tied this to the transition of electric vehicles coming onto the grid. He emphasized grid planning and being prepared by utilizing diverse load portfolios.

Jeff Dennis said that aggregators have told him that they see themselves as the primary point between RTOs and DERs. As of now, the need is to focus on getting the right processes and signals in place.

Danielle Croop replied that PJM Interconnection is having similar discussions as CAISO. Her expectation is to have interconnection processes at the state level for DERs for the initial step. After this, aggregators would come to PJM to aggregate. Ms. Croop spoke about PJM's process for reviewing aggregators to come online. She said that a future project for PJM to take on is the mapping of DERs at a more granular level.

Q6. Mladen Kezunovic, Texas A&M University, asked how DERMS participation in the wholesale markets fits into integrated distribution and integrated resources planning. He also asked where the resilience aspect fits into the conversation.

Jill Powers replied that CAISO's introduction of the DER aggregator participation model did not consider it as being one that would provide resource adequacy. This is the reason that CAISO did not include it in the Integrated Resource Plan (IRP); however, they are working on incorporating it.

Danielle Croop said that PJM Interconnection is also working on the inclusion of a DER aggregator participation model in their IRP and their long-term planning processes. She outlined how load calculations would change.

Joe Woomer said that planners do not have good insight into DERs. They are currently viewed as load reducers; however, this vision will change. Mr. Woomer believes that aggregation will give more visibility to DERs so this will help to better utilize them.

Tony Johnson referenced two white papers that SCE put out which discussed DERs as primary resources. He spoke about how the grid will look and operate completely differently once this occurs.

Q7. Flora Flygt, American Transmission Company (Ret.), asked Danielle Croop and Jill Powers about how their additional studies will be done, specifically, the role that distribution utilities play. Ms. Flygt also asked about the source of investments and how regulators will allocate costs.

Ms. Croop clarified that PJM Interconnection would not do studies; they will be done at the utility level. She set forth ideas that the utilities might investigate.

Ms. Powers said that CAISO requires a 30-day review for distribution companies. CAISO does not start looking into allowing an aggregator in unless they have prior concurrence.

Tony Johnson spoke about the rate case processes that SCE went through for implementation.

Joe Woomer replied that there will be a mixed approach regarding what utilities go to regulators about. The regulators' concern is ensuring that investments are affordable for consumers.

Jeff Dennis said that he could see DOE playing a role in developing cost-benefit analysis models.

Q8. Kimberly Denbow, American Gas Association, asked about potential cybersecurity concerns related to DERs.

Tony Johnson said that there are concerns, and he is working on cybersecurity guidelines for DERs. He highlighted the complexity of this because of the broad ecosystem in which DERs interact.

Jeff Dennis suggested the perspective that there are cybersecurity threats for everything nowadays. He said that the big issue is ensuring that DER owners and aggregators are complying with proactive measures for security.

Q9. Tom Bialek, San Diego Gas & Electric Company, asked Dr. David Kathan about his takeaways from the discussion.

Dr. Kathan responded that these are all issues they expected to be brought up. He found it to be a useful discussion and sees coordination as the top priority.

Q10. Rick Mroz, Resolute Strategies, asked whether DERs should be considered under the bulk power system or distribution system for cybersecurity standards.

Tony Johnson outlined how SCE addressed cybersecurity.

Joy Ditto, America Public Power Association, spoke about the difficulty of addressing cybersecurity in the electricity sector because it is intertwined across a massive geography at multiple levels. She said that a secure supply chain is a root aspect of cybersecurity. Ms. Ditto added that the goal of utilities is to keep the lights on for customers and they are eager to take proactive steps in a reasonable manner.

Jeff Dennis emphasized the importance of a secure supply chain and said that this is an area where DOE can step in.

Q11. Sharon Allan, Smart Electric Power Alliance, asked how DOE can play a role in helping smaller utilities and regulators implement FERC Order 2222.

Tony Johnson replied that DOE can start by looking at use cases for when it becomes necessary for local utilities to have the ability to manage their own grids.

Joe Woomer said that whenever something is brought to the commission, there must be a need. There is a general cultural trend that failure has to occur before action is taken. Mr. Woomer agreed that DOE can help identify the urgency of grid investment. He said that DOE also can potentially create incentives, similar to the Rural Electric Act, in that the government will assist with upgrading distribution.

Q12. Wanda Reder, Grid-X Partners, brought up the point of where the customer falls in this conversation. She said that it would be helpful for DOE to look at demand response and batteries, specifically, how they will impact the grid once they get online. Ms. Reder said that things get tricky regarding nodes and compliance because of the various cutoff points.

Bob Cummings commented that compliance will ultimately fall to the utilities because the standards in place do not specify kilovolt cutoff points.

Q13. Mladen Kezunovic, Texas A&M University, commented that there is an increase in studies addressing consumer growth and behavioral trends. He asked whether there should be a recommendation about furthering cross-governmental coordination to better address consumer habits.

Tony Johnson said that the human factor is a great element of the unknown. Human actions [how they use electricity] will ultimately dictate how the grid functions.

Jeff Dennis said that aggregators and grid operators must consider their comfort level with data analytics and service reliability.

Joe Woomer said that aggregators should have reserves built into their grid participation contracts or else the grid will increase its vulnerability. Mr. Woomer clarified that, from the utility perspective, aggregators need to be responsible for reserves or else the utility is left providing them.

Tom Bialek responded to Mr. Woomer's point about reserves. He said this will be priced in when analyzing cost-effectiveness making it difficult when building into models.

Tom Bialek spoke about his takeaways from the conversation. The day's conversation will help state-federal coordination and advanced grid design work products.

Q14. Daniel Brooks, Electric Power Research Institute, asked for a final comment regarding what DOE can do to assist the implementation of FERC Order 2222.

Tony Johnson said that working to get consensus across the states would be most helpful due to the different ways in which they are run.

Joe Woomer responded that supplying a cost-benefit analysis and proposing a realistic timeline for utilities to implement Order 2222 are two ways DOE can help.

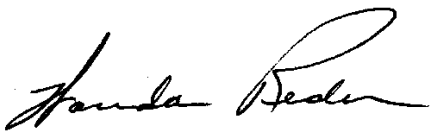
Jeff Dennis said that coordination of DERs was his top area to address.

Danielle Croop said that developing use cases and highlighting coordination are most important.

Wrap-Up and Adjournment of Day 1

Chris Lawrence, EAC Designated Federal Officer, thanked Daniel Brooks, Electric Power Research Institute, for moderating both of the sessions, and the panelists for their participation. Mr. Lawrence adjourned the meeting for the day.

Respectfully Submitted and Certified as Accurate,



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

4/27/2021
Date

Michael Heyeck
The Grid Group, LLC
Vice-Chair
DOE Electricity Advisory Committee

4/27/2021
Date

Christopher Lawrence
Office of Electricity
Designated Federal Official
DOE Electricity Advisory Committee

4/27/2021
Date