



**U.S. Department of Energy
Electricity Advisory Committee Meeting
Hosted Virtually Via WebEx
October 14, 2020**

Meeting Summary

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Meeting Summary

This was the third and final Electricity Advisory Committee (EAC) meeting of 2020 and was held virtually, given the COVID-19 pandemic. On the first day of the meeting, Acting Assistant Secretary Patricia Hoffman, of the Department of Energy's (DOE) Office of Electricity (OE), provided an overview of OE's year while giving insight to her priorities moving forward. Deputy Assistant Secretary for Energy Resilience Chuck Kosak, of OE, spoke about OE's infrastructure national security initiatives. Jennifer DeCesaro and Johanna Zetterberg, both of OE, gave an in-depth presentation about the Defense Critical Electric Infrastructure (DCEI) Program. This presentation led to a roundtable discussion between the EAC members and DOE. Darlene Phillips, of PJM, hosted a rapid-fire response session with the EAC members to get input about the EAC's State-Federal Coordination initiative. Lola Infante, Chair of the Energy Storage Subcommittee, provided an update about her subcommittee and Neha Rustagi, from DOE's Hydrogen Program, capped off the update by overviews of hydrogen initiatives within DOE.

Welcome, Introductions, and Developments Since the May 2020 Meeting

Christopher Lawrence, EAC Designated Federal Officer, began by introducing himself and all the EAC members introduced themselves. Mr. Lawrence then officially called the meeting to order. Wanda Reder outlined the day's agenda, reviewed etiquette for the virtual meeting, and invited Ms. Hoffman to provide an update on OE programs and initiatives.

Update on Office of Electricity (OE) Programs and Initiatives

Ms. Hoffman welcomed everyone, acknowledged new members, and thanked former Assistant Secretary Bruce Walker for his contributions to OE. She noted the office will continue to develop the North American Energy Resiliency Model (NAERM), participate in the Energy Storage Grand Challenge, and spearhead the Bulk-Power System Executive Order (BPS EO) execution, among other activities. Ms. Hoffman was limited with what she could share regarding the BPS EO due to *ex parte* rules but said more information can be found on a dedicated website. Ms. Hoffman reviewed notable BPS EO events from the previous few months before outlining next steps. She noted that OE is planning to take a holistic approach to address the threat. Ms. Hoffman thanked the Committee for their dedication and quick turnaround to answer the Energy Storage Grand Challenge Request for Information. She highlighted the encompassing intra-agency efforts underway while giving a specific shout out to Pacific Northwest National Laboratory's Grid Storage Launchpad initiative. DOE sees energy storage as a grid asset.

Ms. Hoffman was pleased to see Big Data Analytics on the agenda because this is a priority topic for her. She sees data analytics as an area where OE can grow. Machine learning and artificial intelligence will be integral in the development of data analytics, specifically to help with overall awareness for grid asset management. Ms. Hoffman briefly spoke about NAERM, describing that it pulls data from sensors for real-time data and the model will help identify interdependencies and planning against threats. Ms. Hoffman mentioned a recent \$65 million funding opportunity announcement between OE and the Office of Energy Efficiency and Renewable Energy's Building Technologies Office and Vehicle Technologies Office. Ms. Hoffman concluded by saying the State-Federal Coordination discussion will be helpful for leveraging resources and building resilience.

Questions and Answers

Q1. Mladen Kezunovic asked about the funding opportunity's announcement funding number.

The funding number is DE-FOA-0002206.

Q2. Tom Bialek said the Committee talked a lot about long-duration storage, specifically hydrogen, when addressing the Energy Storage Grand Challenge. He asked if Ms. Hoffman has thought about the connection piece to the grid for hydrogen.

Ms. Hoffman replied that OE is collaborating with the Hydrogen and Fuel Cell Technologies Office to update a grid roadmap. She said DOE has to think about storage as a whole across the entire energy paradigm.

Q3. Dave Herlong asked if there is additional thinking about addressing resilience due to this year's storm season.

Ms. Hoffman replied this storm season highlights the importance of damage assessment and predictive analytics. A focal point she wants to address is to show a given community the extent of damage it has faced. The aim of this is to help people understand the severity of storms and the repair process. Ms. Hoffman sees potential for generation through microgrids as a great starting point for communities to rebuild while larger scale projects are offline. She brought up the Stafford Act amendment that provides funding for resilience efforts and noted its importance for State-Federal Coordination. Ms. Hoffman said Florida can be used as a footprint for other states about how to address resilience.

Q4. Joy Ditto observed that Health and Human Services and the Center for Disease Control did not understand the essential work of electric sector workers during the early stages of the COVID-19 disease outbreak. She asked if the perspective of electric sector workers needs to be broadened when covering resilience.

Ms. Hoffman said a lot of lessons can be learned from this. She said it will help states and local communities realize the importance of electric sector workers and what it takes to "keep the lights on."

Update on Electricity Infrastructure National Security Initiatives

Mr. Kosak spoke about the threat foreign adversaries, specifically China, pose to the United States in the context of electricity infrastructure. The root of the threat stems from U.S.-Chinese competition for global dominance. This power grab is being played through diplomatic functions, military, disinformation campaigns, and economics. Mr. Kosak said that China is following a Thucydides trap paradigm in that they are the emerging power seeking to challenge the United States' established position. The United States could historically assert its economic and military powers over other countries but with China heavily investing in military and global infrastructure, that gap is closing.

Society has officially entered the 21st century of war. Classic deterrence theory is underway but in more complex operations due to cyber. The era of asymmetric hybrid warfare is occurring. The DCEI Program would be at the forefront of protecting the country's electric grid as asymmetric cyberattacks are becoming increasingly common. Mr. Kosak reiterated the threat the United States faces and announced the EAC will be launching a new subcommittee that is dedicated to DCEI. He concluded by reading OE's new mission statement.

Questions and Answers

Q1. Dr. Infante asked how to ensure critical infrastructure is protected when there are increasing requirements to publicly share system data.

Mr. Kosak replied that OE created the Critical Electric Infrastructure Information (CEII) classification to help address this. He sees OE working independently with utilities to form stronger trust and partnerships. Mr. Kosak outlined the importance of risk management and holistic interdisciplinary responses.

Q2. Delia Patterson said there are protections in federal and state open records laws that exist today. They can be shored up, but she could not recall a case where a utility/government has stated information needs to be protected for security (physical or cyber) in which an entity was forced to release that information. DCEI should receive even more protections.

Q3. Flora Flygt asked about clarification regarding the BPS EO and where the EAC can help.

Mr. Kosak said the DCEI and the BPS EO are intertwined. He spoke about the different pillars and Ms. Hoffmann's approach moving forward. Mr. Kosak reiterated the threat the United States is facing.

Q4. Ms. Reder shared her excitement about the new DCEI focused subcommittee. She would like it to be set up by the February meeting.

Mr. Kosak said the intent is for the subcommittee to be used as a sound board between the EAC and DOE. He sees the subcommittee better integrating with industry to be at the forefront of threats to help the government be more proactive. Mr. Kosak referenced OE's new mission:

"A secure and resilient power grid is vital to national security, economic security, and the services Americans rely upon. Working closely with its private and public partners, the Office of Electricity leads the Department's efforts to ensure the nation's most critical energy infrastructure is secure and able to recover rapidly from disruptions."

Overview of DCEI Strategy

Ms. Zetterberg reiterated the consensus among the U.S. intelligence communities that foreign adversaries are increasing their attacks and getting smarter about how to target the energy sector. The most critical aspect of operations is to maintain the country's Command, Control, Communications, Computers, Intelligence, Surveillance, and Recognizance (C4ISR) networks. Ms. Zetterberg provided the Federal Power Act definitions of Critical Defense Facilities and Defense Critical Electric Infrastructure.

Ms. Zetterberg then spoke about the DCEI approach. This encompasses OE's unique position being connected to each program office across DOE, reaching outside DOE across other federal entities to form public-private partnerships, and focusing on the niche aspect Mission Assurance within the energy sector. Ms. Zetterberg walked through the four program pillars that make up DCEI: 1. Establish a DCEI coordinated program platform; 2. Develop DCEI funding strategies; 3. Create and maintain key partnerships; and 4. Guide and support analytical capabilities. These pillars will be tracked to follow the maturation of the DCEI Program through defense community partnerships, DCEI investment decision support, analysis of critical infrastructure dependencies, and the President's FY2021 budget request for the DCEI Program. Ms. Zetterberg concluded by outlining the DCEI risk management process for technical analysis.

Questions and Answers

Q1. Rick Mroz asked if DOE has already identified facilities. Mr. Mroz commented that state-level partners (distribution companies, investor-owned utilities, public utilities) with different state-level regulations need to be involved in DCEI conversations.

Mr. Kosak said he wrote DOD's Mission Assurance policy prior to moving to DOE. Facilities were chosen based off their criticality and vulnerability to DOD's operations. The facilities were identified through DOD and passed to DOE. Mr. Kosak said the number of facilities is "manageable."

Ms. Zetterberg agreed with Mr. Mroz's second comment. DOE plans to include regulators along with the National Association of Regulatory Utility Commissioners (NARUC).

Q2. Dr. Bialek suggested including third parties trying to leverage information for products and services they provide to customers. He said there are challenges associated with balancing the amount of public information available.

Q3. Clay Koplin said a nationwide effort requires alignment, coordination, and collaboration at every level to put assets in the right places and smooth operations. He asked how DOE will engage with other federal agencies and state-level entities to achieve its goals.

Ms. Zetterberg agreed about the need for relationship building on several levels. She said this will be a long-term process and hopes the EAC can help facilitate stakeholder partnerships.

Q4. Dr. Kezunovic said the ability to predict outages would be a game changer moving forward because this is when energy supply is most vulnerable. He asked how much of this technology is incorporated in DOE's DCEI plan.

Ms. Zetterberg replied this idea can help highlight the difference between outages from natural disasters and intentional cyberattacks.

Ms. Ditto said the American Public Power Association (APPA) has a reliability tracker that looks at data points over time. This tool currently has over 500 utilities involved and makes it easier to predict outages.

Q5. Ms. Flygt said industry has struggled with quantifying the cost of outages and is looking to improve. She suggested reaching out to the insurance industry regarding costs of outages because they are constantly evaluating these risks.

Dr. Bialek reiterated Ms. Flygt's idea to get input from other industries. He suggested DOE help with the education aspect of DCEI and electricity planning because even commissioners do not fully understand the breadth of the threat to the nation's electric grid.

Q6. Jay Morrison gave the reminder that some utilities supporting DCEI sites are small, rural co-ops that do not have the same capital as larger investor-owned utilities. It is important these utilities are included early in the conversations to find low cost initiatives.

Ms. Ditto reiterated Mr. Morrison's concern and noted the consumers in these small towns should not bear the cost of expensive upgrades for DCEI sites. She said some of these conversations are already occurring on the ground between small utilities and defense facilities.

Ms. Zetterberg said that electric co-ops will play an integral role in this process and this highlights the need to operate at a local level.

Moderated Roundtable Discussion Between DOE and EAC Regarding Grid Security

Ms. Zetterberg asked the EAC for advice about how DOE can most effectively engage with stakeholders and partners along with advice about technical analysis.

Q1. Ms. Phillips suggested convening multiple stakeholders together at a single time because the cross collaboration could lead to multiple issues solved within one conversation. Regarding costs, PJM struggles with distributing cost to make sure smaller town co-ops are not overburdened, but this is a work in progress. She sees cost sharing to be one of the most important issues that needs to be solved.

Q2. Ms. Reder asked how DOE is addressing cross-regional threat vectors and where the EAC can potentially play a role.

Mr. Kosak said aggregating best practices will be an important first step so there is a reference point of what works and where there are gaps. He is optimistic about working with the EAC because the federal footprint can only reach so wide and he sees the EAC bridging shortfalls. The federal government can influence the conversation but can be limited regarding the pace it moves and creating funding opportunities. Mr. Kosak encouraged EAC members to provide feedback and input about where they see gaps and how to help address this issue. He believes the looming cyber threat can be as impactful as 9/11 (not in terms of death but the magnitude of the attack).

Q3. Mr. Mroz suggested looking into the planning process of defense facilities brought online within the last several years to see how they went about protecting their DCEI, specifically relating to Distributed Energy Resources (DERs). He said that some planning has been done at the local level with emergency management officials. Mr. Mroz highlighted the need to make sure essential functions, such as running water, within facilities can operate during an outage.

Mr. Kosak said a potential idea to help protect DCEI sites would be putting together a template for areas to address vulnerabilities.

Q4. Mr. Koplin suggested recruiting organizations that already practice resiliency because they will be steps ahead having already gone through failures and achieved successes. Mr. Koplin said the way thinking about what a potential cyberattack might look like needs to expand. He provided the example that a bad actor can exploit a 100°F day by hacking into buildings' operations and shut off their air conditioning. Small acts like this could lead to big, severe consequences.

Ms. DeCesaro agreed with Mr. Koplin saying there are already solutions in place and infrastructure investment occurring. The next step is to be increasingly proactive with investments, that way when hurricanes, for example, occur, they may not be disasters and the impact will be suppressed.

Q5. Dr. Kezunovic asked if changes need to be made to existing DCEI site designs and do actions need to be taken regarding operations. He also commented about the quickly changing threat landscape.

Q6. Bob Cummings has observed that some outages are mis-categorized because although a hurricane might have been the big event, there are barriers in place to prevent outages that did not go off. He noted the importance of analyzing events to see if the system worked correctly.

Q7. Rob Lee sees some of the biggest challenges being picking a winner to scale technology and advising communities on technology that does not work. The apprehension across the federal government,

NARUC, National Association of State Energy Officials (NASEO), and utilities stems from an overabundance of programs. Mr. Lee asked how DOE looks to address the many competing programs in the sense of advocating to congress that all these initiatives are not needed.

Mr. Kosak replied DOE must assert itself as the clear leader regarding the energy sector and cyber threats. He sees the EAC playing an integral role through a deeper partnership acting as a springboard and “eyes on the ground” within industry.

Q8. Paul Stockton asked about the process of scoping and defining DCEI within the context of DOE, specifically the supporting infrastructure functions.

Mr. Kosak replied DOE takes the role of making sure utility functions are protected, that way the “warfighters” can focus on their duties. DCEI sites heavily rely on commercial infrastructure so a point of emphasis for DOE is to work with industry to make sure electricity smoothly flows into these sites.

Q9. Sharon Allan replied there needs to be regional-specific engagement with representatives from the local level (governor, mayor, or regulator staff member). She reiterated the need for defining resilience and putting forth metrics so utilities can quantify the need for improvements.

Q10. Ms. Ditto said there needs to be direct conversations between DOE and DOD that include the DCEI facilities. When this occurs, tangible cost allocations can be presented to congress to enact appropriations.

Q11. Dr. Bialek spoke about the importance of leveraging the labs for maximum output. He suggested DOE think about restoration plans in the event an attack occurs and consider resources from an energy density perspective.

State-Federal Coordination Discussion Between DOE and EAC Regarding Grid Security

Ms. Phillips outlines that this discussion will ask all the members to give their input for two questions as part of the effort to collect input about the State-Federal Coordination topic. The two questions are: 1. What is the top federal/state boundary issue to your organization or constituents; and 2. In thinking about a framework that the DOE might utilize to begin to address state/federal coordination matters, what things need to be considered for success (people, processes, organizations, regions, etc.)?

Mr. Mroz said the conversations need to incorporate NARUC, NASEO, and state officials. The “planning of the future grid state” is a pressing issue, particularly where federal jurisdiction ends and state work begins. Mr. Mroz observed that planning went by the wayside once states started deregulating.

Ms. Patterson said APPA’s most pressing issue is FERC jurisdiction creeping into local authority. It is critical to have clearly defined objectives for when DOE starts to convene conversations.

Ms. Ditto added the Federal Power Act created some natural tension between state and federal jurisdiction.

Ms. Flygt said citing transmission lines has historically been a major issue but the definition and metrics about resiliency have overtaken that. The type of services and classification of energy storage is a priority issue as well. She also said the integration of DERs regarding FERC Order 2222 will shape the future grid. For the framework question, the conversation should be around what the future grid will look like. A reference point will be the list of grid services developed by the North American Electric Reliability Corporation’s (NERC) Distributed Energy Resource Management Systems (DERMS) working group.

Sheri Givens said she comes from a state perspective. A concern she sees is the lack of a federal climate action policy because states are moving forward and this movement will get a big push if the federal government takes steps as well.

Ms. Reder said DERs are the top issue as transmission and distribution weave together. There needs to be conversations about safety, data quality, privacy, and reliability to facilitate what is right for customers. She said DOE is in the best position to be a convener and now it is time to reach out to industry.

Ms. Allan said looking at the infrastructure supporting electrification would be a great first step. She gave the example of electric vehicle (EV) charging stations along interstate highways.

Drew Fellon said the customer voice needs to be part of the conversation. The industrial partner can be a big piece of the conversation and solution, once they are included.

Craig Wiener said if an attack occurs through a given customer, they are still going to be fined even if they are not responsible or had the right mechanisms in place. He’s seen that “sophisticated attacks” are often not nearly as complex as put out to be. The reason an attack breaks through is because people do not have a prudent measure of technological sophistication in their computer network defense systems. A question to ask is: At what point are people held harmless, if the right measures are in place? For framework, it is important to understand the relationships between DOE, FERC, and NERC.

Nicole Lowen said she would like to see more coordination regarding offshore wind development with the federal government. For the framework, she said states should look to Hawaii and island grids for how to transform their future grids because there are success stories throughout the state.

Consideration of resiliency and renewable energy affordability should be part of the framework. She highlighted that the utility in Kauai operates at nearly 100% renewable energy full time.

Jim Yacone said clarifying guidance on state/federal asset classifications would be helpful. There would ideally be a task force set up to address the framework of this issue.

David Wade said there needs to be a defining boundary between the customer and utility/grid owners. This line is being blurred with DERs coming online and electricity now flowing both ways.

Chris Ayers said his biggest issue is the citing, integration, and cost allocation of the Public Utility Regulatory Policies Act (PURPA) and merchant plant projects. There is no guidance to evaluate the determination of need for projects or how states can regulate PURPA and merchant plant projects to ensure cost effective integration into the overall grid. For framework, Mr. Ayers suggested vertically integrated states, the National Association of State Utility Consumer Advocates (NASUCA), NARUC, and the National Association of State Energy Officials (NASEO) be incorporated in the conversation.

Don Parsons said reporting information about cyber security is an area where he faces roadblocks.

Dr. Kezunovic said he looks at inequities of how the cost is passed on to consumers through rates and how outages affect various groups in society differently. He spoke about the susceptibility of different demographics to outages, specifically people who are dependent on medical devices and those that live in coastal areas. Dr. Kezunovic said the boundary between state/federal jurisdiction needs to be clarified.

Mr. Cummings said the Institute of Electrical and Electronics Engineers' (IEEE) standards in the DER/inverter space should be implemented on a near uniform basis because each state has different regulations and standards. He mentioned the planning process for a future grid needs work and cited the challenges of EV charging stations along interstate highways. Mr. Cummings highlighted the ongoing challenges of who pays for infrastructure projects.

Mr. Mroz referenced the Smart Grid Collaborative between FERC and NARUC as a good example for something to mimic. He suggested DOE identify where its research can best lead as a convener and work with various stakeholders. Then, to go a step further, if possible, have small working groups for each specific issue.

Mr. Koplin said FERC's ability to regulate local dams is a financial impact he faces. Mr. Koplin spoke about difficulties he faces with federal regulations being overbearing and sometimes out of touch. He suggested the more power local/direct stakeholders have, the better the decision process will be.

Ms. Phillips reviewed some of the main themes she noticed. These included jurisdictional creep between state and federal boundaries, citing transmission lines, DER development, and climate policy. For framework, the themes include customer voices being heard, taking holistic approaches, all-encompassing stakeholders, and vertically integrated state inclusion.

Mike Heyeck stressed the importance of staying focused on actions DOE can feasibly do. He said the aggregation of DERs reduces price points through economies of scale. Another priority should be energy

storage because if energy storage is not deployed at the same level of renewables, then the renewables will not meet their potential.

Energy Storage Subcommittee Update

Dr. Infante spoke about updates since the May 2020 meeting. The Energy Storage Subcommittee provided recommendations for the Energy Storage Grand Challenge (August 2020) and is on track to complete the 2021 Energy Storage Plan Assessment. The Subcommittee is exploring the topic of power to gas, specifically regarding the role of hydrogen. The Subcommittee is looking to have a February panel about optimizing energy storage operations and benefits. The panel will dive into the co-location of energy storage with renewable generation and cohesive approaches for dispatching energy storage for charging and discharging.

Ms. Rustagi spoke about her office and the Hydrogen and Fuel Cell Technology Advisory Committee. The H2@Scale initiative within the Hydrogen office published its analysis regarding the outlook of hydrogen over the next several decades. She let the Subcommittee know her office published two records (available on their website) about the cost of electrolysis today and the cost of hydrogen delivery and dispensing into light duty vehicles. Ms. Rustagi also spoke about a joint program with OE about hydrogen integration outlook.

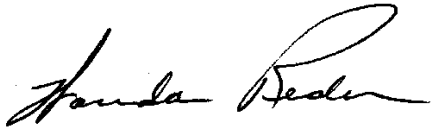
Dr. Bialek has observed that some of California's renewable energy goals do not seem feasible with current technology given several gaps. He sees hydrogen playing a role in the reduction of CO2 emissions, but there needs to be concrete planning to make this happen.

Wrap-Up and Adjourn Day 1

Ms. Reder reviewed the day by highlighting a couple main points from each session and concluded by giving a brief overview of Day 2.

Happy Birthday Mike Heyeck!

Respectfully Submitted and Certified as Accurate,



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

1/12/2021

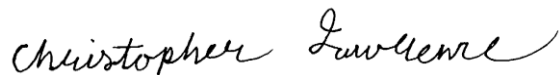
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Christopher Lawrence
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Designated Federal Official
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