U.S. Department of Energy

Electricity Advisory Committee Meeting

Hosted Virtually Via WebEx

June 9, 2021

Meeting Summary

PARTICIPANTS

Electricity Advisory Committee (EAC) Members:

SHARON ALLAN
Smart Electric Power Alliance

CHRISTOPHER AYERS
North Carolina Utilities Commission Public Staff

TOM BIALEK
San Diego Gas & Electric Company

DANIEL BROOKS
Electric Power Research Institute

PAUL CICIO
Industrial Energy Consumers of America

ROBERT CUMMINGS
Red Yucca Power Consulting

ANN DELENELA
Entergy

KIMBERLY DENBOW
American Gas Association

JOY DITTO
American Public Power Association

DREW FELLON
Alliance Advisory Services

FLORA FLYGT
American Transmission Company (Ret.)

MICHAEL HEYECK
The Grid Group LLC

PAUL HUDSON
General Infrastructure, LLC

LOLA INFANTE
Electric Power Research Institute

JORDAN KAREM
Red Arrow Strategies

MLADEN KEZUNOVIC
Texas A&M University

CLAY KOPLIN
Cordova Electric Cooperative

ARTIE KRESSNER
Grid Connections, LLC

DAVID LEBETER
Hydro One

REP. NICOLE LOWEN
Hawaii House of Representatives

JAY MORRISON
ElectriCities of North Carolina Inc.

RICHARD S. MROZ
Resolute Strategies, LLC

REP. DON PARSONS
Georgia House of Representatives

DELIA PATTERSON
American Public Power Association

DARLENE PHILLIPS
PJM Interconnection LLC

WANDA REDER
Grid-X Partners LLC

PAUL STOCKTON
Paul N Stockton LLC

DAVID WADE
Electric Power Board of Chattanooga

TOM WEAVER
American Electric Power Company Inc.
(Ret.)

Registered U.S. Department of Energy:

MATT ARONOFF
Department of Energy

REBECCA ASCH
Department of Energy

MICHAEL COE
Department of Energy

GREG DIERKERS
Department of Energy

JAYNE FAITH
Department of Energy

JACOB HERBERS
Department of Energy

PATRICIA HOFFMAN
Department of Energy

CHRIS IRWIN
Department of Energy

SANDRA JENKINS
Department of Energy

JOYCE KIM
Department of Energy

PUESH KUMAR
Department of Energy

CHRISTOPHER LAWRENCE
Department of Energy

KEVIN LYNN
Department of Energy

MICHELLE MANARY
Department of Energy

DAVID MEYER
Department of Energy

MELISSA MONK
Department of Energy

AARON NG
Department of Energy

JOE PALADINO
Department of Energy

MELISSA PAULEY
Department of Energy

MOLLY ROY
Department of Energy

LEE SLEZAK
Department of Energy

MERRILL SMITH
Department of Energy

CYNDY WILSON
Department of Energy

JOHANNA ZETTERBERG
Department of Energy

Registered Speakers, Guests, and Members of the Public:

RYAN ALCORN
K&L Gates

SHARLA ARTZ
Xcel Energy

LINQUAN BAI
University of North Carolina at Charlotte

RYAN BAKER
City of Oklahoma City

CHRISTINA BIGELOW
Georgia Systems Operation Corporation

GEORGE BOORAS
Electric Power Research Institute

DICK BROOKS
Reliable Energy Analytics LLC

VIVIAN BRIDGES
K&L Gates

CULLIN BROWN
BCS LLC

TANYA BURNS
Arara Blue Energy Group

EDDIE CHRISTY
National Energy Technology Laboratory

LELAND COGLIANI
Lewis-Burke Associates

LYNN COSTANTINI
National Association of Regulatory Utility Commissioners

STEPHANIE CRAWFORD
National Rural Electric Cooperative Association

STEVE ELLIOTT
Enbridge

NEVA ESPINOZA
Electric Power Research Institute

CHRIS FISH
McAllister & Quinn

MARCEL GALJEE
Nouryon

JOHN HOWES
Redland Energy Group

LAUREN HUGHES
Washington Policy & Analysis

DAVID HUNTER
Electric Power Research Institute

HASSAAN IDREES
Jacobs

BOBBY JEFFERS
Sandia National Laboratories

SHELBY KARPA
Electric Power Research Institute

WAFA KHALIL
NC WARN

SARAH LADIN
Institute for Policy Integrity

ZIZHAN LADIN
U.S. Congress

RENEE LANI
American Public Gas Association

PETER LARSEN
Lawrence Berkeley National Laboratory

JODY LEBER
CSA Group

ANNEMARIE MANGER
Tata Steel Europe

STEPHEN MAYFIELD
City of Tallahassee Natural Gas Utility

JUSTIN MEYERS
Nelson Mullins

MAJIDA MOURAD
Tellurian

CASEY NEWELL
McAllister & Quinn

JAKE PARDUHN
McAllister & Quinn

BILL PFISTER
Edison Electric Institute

ASHTON RAFFETY
National Association of Regulatory Utility Commissioners

MARY ANN RALLS
National Rural Electric Cooperative Association

MICHAEL RUTKOWSKI
Gas Technology Institute

NICOLE SCHEIB
Electric Power Research Institute

EMILY SCHMIDLIN
Bracewell LLP

DENICE SIMPSON
Ameren Services Company

ELIZABETH STIPNIEKS
E. Stipnieks Strategies

BRENDAN TIMMONS
Malta Inc.

FRANK TUFFNER
Pacific Northwest National Laboratory

CHRISTIAN VASQUEZ
E&E News

KIRSTEN VERCLAS
National Association of State Energy Offices

ROBERT WIMMER
Toyota Motors North America

KERRY WORTHINGTON
National Association of Regulatory Utility Commissioners

Registered ICF/ Support:

DANIEL GRAY
ICF

JOSH SMITH
ICF

COLE WHEELER
ICF

RONKE LUKE
ICF

SAMIR SUCCAR
ICF

* * * * *

Meeting Summary

This was the second regularly-scheduled 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 (AS) Patricia Hoffman, Department of Energy's (DOE) Office of Electricity (OE), mainly discussed OE's Fiscal Year (FY) 2022 budget proposal. Puesh Kumar, Acting Principal Deputy Assistant Secretary (PDAS) of the Cybersecurity, Energy Security, and Emergency Response (CESER) Office, discussed CESER's role within the Department and highlighted a few items within CESER's FY 2022 proposed budget. Kimberly Denbow, American Gas Association, moderated a panel session entitled, "Working Together Toward a Sustainable and Resilient Zero Carbon Emission Future: Hydrogen, Batteries, and Natural Gas." The panel featured speakers from Electric Power Research Institute, Gas Technology Institute, Toyota Motors, Nouryon, Tata Steel Europe, and Enbridge. A moderated roundtable discussion between the EAC members and panelists followed the panel presentations.

The day concluded with each of the subcommittee chairs and vice-chairs providing an update on their respective subcommittees.

All presentations, as well as recordings from this meeting, can be found at:
https://www.energy.gov/oe/june-9-10-2021-meeting-electricity-advisory-committee

Welcome, Introductions, and Developments Since the February 2021 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 AS Hoffman to provide an update on OE programs and initiatives.

Update on Office of Electricity Programs and Initiatives

Michelle Manary, Deputy Assistant Secretary for OE's Energy Resilience Division, introduced herself to the EAC. She discussed her background at Bonneville Power Marketing Authority and her vision for the division.

Acting AS Hoffman began by expressing appreciation for the EAC. She mainly discussed OE's FY 2022 proposed budget. The Office had a $115 million increase compared with the FY 2021 enacted budget. Acting AS Hoffman said that OE will have an integral role assisting Secretary Jennifer Granholm with her vision of transmission deployment. The transmission aspect of the budget will entail siting, technical assistance, permitting, upgrades on existing systems, and building out how to make a decarbonized grid a reality. The other areas Acting AS Hoffman mentioned were long-term transformational strategies, cutting-edge technologies, next-generation transformers, and microgrid integration. Acting AS Hoffman also discussed grid-scale energy storage. She noted and thanked the EAC for its review of DOE's programs associated with the Five-Year Energy Storage Plan.

Acting AS Hoffman mentioned DOE's Hydrogen Earthshot Initiative. She said that it showcases DOE's aggressive goals and that people should expect more of these types of initiatives across the department. Acting AS Hoffman wants to emphasize OE's coordination with states, specifically about permitting. She

spoke about the importance of grid architecture at the transmission and distribution intersection. Regarding distributed energy resource (DER) integration and the Federal Energy Regulatory Commission's Order 2222, Acting AS Hoffman wants OE to focus on thinking about grid architecture at the distribution level and strategizing business models as DERs become further integrated. It is integral to take a holistic view of the electricity system. She said that sensors are still a priority within OE for the value they provide with real-time info, monitoring the state of the grid for operators, and their help with timing and synchronization. Acting AS Hoffman concluded by saying cybersecurity will be incorporated into OE's research and development efforts.

Questions and Answers

Q1. Ms. Reder asked about OE's plans for demonstration projects within OE's FY 2022 proposed budget.

Acting AS Hoffman said that OE will look at funding opportunity announcements, and she mentioned microgrids, energy storage, and dynamic line ratings. She added the caveat that OE's efforts in those areas will depend on actually receiving the requested funds. Acting AS Hoffman said that OE and the National Labs may add layers to the North American Energy Resilience Model that address transmission investment and planning to allow more forward-looking assessments. Acting AS Hoffman also let the EAC know that several of OE's emergency authorities will be moving to the Office of Cybersecurity, Energy Security, and Emergency Response (CESER).

Q2. Paul Hudson, General Infrastructure, LLC, asked about lessons learned by DOE from the Eastern Interconnection Planning Collaborative (EIPC) and Eastern Interconnection States Planning Council (EISPC) projects for transmission development.

Acting AS Hoffman said she sees an opportunity to leverage the EIPC and state engagement in EIPC-type programs. There will likely be opportunities for collaboration on identifying transmission priorities.

Update on DOE Office of Cybersecurity, Energy Security, and Emergency Response Programs and Initiatives

Acting PDAS Kumar spoke about how CESER fits within the broad scope of DOE's mission. He highlighted the importance of external stakeholder partnerships. Acting PDAS Kumar gave context to the Colonial Pipeline incident, explaining how the cyber-attack turned into an energy supply issue. He discussed the importance of building strong partnerships. CESER's stakeholder outreach paid dividends during the Colonial Pipeline incident because they had built strong relationships during "blue sky" days when companies and systems operate under normal conditions. When the "black sky" incident occurred, CESER, Colonial Pipeline, states, and other stakeholders were more prepared thanks to those relationships.

Acting PDAS Kumar discussed how CESER fits into different administration priorities. He referenced the Executive Order (EO) on Improving the Nation's Cybersecurity. This EO encompassed the entire federal government. Its three main aspects are that it removes barriers to sharing cyber threat information among federal agencies, advances federal implementation of cybersecurity practices, and improves federal cyber incident coordination. The administration also announced a 100-day industrial control system (ICS) cybersecurity initiative. This initiative will be a private-public partnership that works with the Electricity Subsector Coordinating Council (ESCC) to improve cybersecurity for ICS. Its goal is to improve detection, mitigation, and incident response.

Acting PDAS Kumar discussed CESER's priorities. He said that their FY 2022 budget request increased by about 29% compared with FY 2021, which was an enacted budget of about $200 million. Acting PDAS Kumar highlighted the three main aspects of CESER's mission: partnerships and information sharing between the private sector and the federal government, developing risk management tools and technology, and incident response and restoration.

Acting PDAS Kumar walked through several proposed DOE organizational shifts that would affect CESER. The Strategic Petroleum Reserve is potentially moving from the Office of Fossil Energy and Carbon Management to CESER. OE and CESER leadership are working to move powers associated with Section 202(c) of the Federal Power Act, Defense Critical Electric Infrastructure, and Critical Electric Infrastructure Information from OE to CESER. Acting PDAS Kumar wrapped up by emphasizing that he looks forward to collaboration with EAC members.

Questions and Answers

Q1. Ms. Reder asked about how the EAC will be involved with CESER's mission as some OE programs are moved into the CESER office.

Acting PDAS Kumar replied that they are still scoping how the EAC can more directly help with CESER. He emphasized the importance of getting the EAC involved with cyber issues.

Q2. Clay Koplin, Cordova Electric Cooperative, spoke about the unique challenges Alaska and Hawaii face regarding foreign adversaries. He asked about deploying technology to Alaska and Hawaii.

Acting PDAS Kumar said that CESER plans on continuing its partnerships with Alaska and Hawaii. He spoke about the importance of addressing hazards at a regional level. He said that he wants cybersecurity to be an enabler for renewable energy deployment.

Q3. Paul Stockton, Paul N Stockton LLC, asked about CESER's plans to address blackstart capabilities as society moves toward non-fossil fuel generation.

Acting AS Hoffman said that this is critical. OE is looking at isolation/segmentation of the system and she stressed the importance of system flexibility.

Acting PDAS Kumar said that the role of DERs as blackstart assets needs to be more actively discussed.

Working Together Toward a Sustainable and Resilient Zero Carbon Emission Future: Hydrogen, Batteries, and Natural Gas

Ms. Denbow introduced the panel and panelists. She stated her concern that the rapid energy transition is limiting the full range of energy generation sources, which increases the risks to the electric grid. Ms. Denbow discussed DOE's hydrogen Earthshot Initiative.

Neva Espinoza, Electric Power Research Institute (EPRI), and **Michael Rutkowski**, Gas Technology Institute (GTI), gave a joint presentation about EPRI and GTI's Low Carbon Resource Initiative (LCRI). The energy system of the future will need to address the three pillars of being clean, affordable, and reliable. Decarbonization, transformation, and resilience are the three areas critical to achieving a next-generation electricity sector.

Mr. Rutkowski said that GTI's vision emphasizes the need for diverse energy generation sources, and that current infrastructure needs to be used for next-generation deployment. An integral part of the energy transition relies on the ability to convert fuel sources from liquid to gaseous forms to meet a wide variety of end uses.

Ms. Espinoza highlighted the role of modeling and analysis in meeting carbon goals. She noted that the electric sector has seen emissions reductions of about 15% over the past 15 years. Ms. Espinoza said that the electric sector will have to triple its rate of decarbonization to reach an emissions target of 50% below 2005 levels. Ms. Espinoza discussed the scope, mechanisms used, and end goals of the LCRI.

Mr. Rutkowski identified areas across the energy ecosystem where different forms of energy can be most efficient and effective at reducing emissions. He reiterated that there will be a diverse set of potential solutions. The LCRI is unique in that it is a collaboration with a diverse group of 40+ stakeholders, including energy system manufacturers, electric utilities, gas utilities, international organizations, and others. EPRI and GTI are about a year into the program with 14 projects online. The next step is conducting research based on feedback from participating organizations

Robert Wimmer, Toyota Motors North America (Toyota), let the audience know his company is on the demand side of hydrogen. Mr. Wimmer discussed the actions Toyota is taking to decarbonize its vehicles. In 2019, Toyota stated a goal of a 90% reduction in tailpipe emissions on a global basis by 2050. Mr. Wimmer outlined goals of the initiative and highlighted benchmarks along the way. He foresees more vehicles offered as hybrid-only before transitioning to fully electric. Mr. Wimmer noted that electrification takes time. For example, although the first Prius launched in 1999, it took more than a decade before production and sales ramped up dramatically.

Mr. Wimmer broke down the cost of hydrogen refueling stations compared with typical gas stations. His takeaway was that the costs are similar. Mr. Wimmer spoke about the potential uses for hydrogen in the transportation sector, including heavy-duty vehicles, buses, forklifts, and medium-duty trucks. Mr. Wimmer discussed a project in California between Toyota, Kenworth, Shell, and the Port of Long Beach. This project is utilizing hydrogen for a cargo truck route between the Port and Ontario, California. Mr. Wimmer agreed with the other speakers about the need for diversification of energy generation. He concluded by saying that potential forms of energy such as biogas should not be ruled out as feedstocks for hydrogen production.

Marcel Galjee, Nouryon, and **Annemarie Manger**, Tata Steel Europe (Tata Steel), gave a joint presentation about the Nouryon and Tata Steel partnership to increase the use of hydrogen as a fuel source in the Netherlands. Mr. Galjee discussed the role of hydrogen in decarbonization. He said that the focus sectors are aviation, shipping, plastic, and fuel. A hurdle facing the deployment of hydrogen is getting it to scale and building a value chain. Hydrogen production stakeholders are looking to cut costs by 80% within the next 15 years. Mr. Galjee's message was that as investments in hydrogen technology increase, innovation will increase as well.

Ms. Manger began with a deep dive on the 250-megawatt Rotterdam project jointly sponsored by Tata Steel, BP, and the Port of Rotterdam. The project aims to build an ecosystem for steel production, aviation, and other forms of transportation. Ms. Manger noted how this project will connect renewable energy generation with existing natural gas infrastructure. It will achieve greater success once hydrogen storage facilities in the region are developed and connected to the network. She walked through Tata Steel's plan to achieve carbon reduction goals via the use of hydrogen as a fuel source.

Steve Elliott, Enbridge, presented about the role of natural gas systems in a net zero future. He provided context on Enbridge's role in North America's gas infrastructure. He spoke about the potential for hydrogen integration as a means of both energy and storage. Mr. Elliott discussed Enbridge's Markham Project, a joint project with Cummins that was commissioned in 2018. It is a cross-cutting project where hydrogen can be stored, converted back to electricity, or distributed to customers.

Mr. Elliott walked through how to have a carbon-neutral energy supply while still relying on natural gas. He outlined how different levels of hydrogen blending into the natural gas system would affect energy use. Mr. Elliott mentioned a few government policies and regulatory frameworks that can help push hydrogen implementation. He suggested that the focus be on the carbon intensity of hydrogen as a final product rather than on specific forms of production.

Open Discussion Among Members About the Storage Panel Presentation

Q1. Dr. Stockton asked about potential additional measures that can be taken for natural gas support to Department of Defense microgrids.

Mr. Elliott replied that he is not familiar with this specific initiative. He emphasized the importance of maintaining a diverse energy mix because that will lead to increased resilience.

Mr. Rutkowski reiterated the need for a diverse energy generation mix. He said that this ties into microgrids and overall resilience.

Ms. Espinoza said that microgrids are a great pathway for pilot and demonstration projects at a small scale. Microgrids are a great opportunity to demonstrate the entire value chain as a storage mechanism and as a fuel.

Q2. Lola Infante, EPRI, asked about the role of hydrogen in long-duration storage and how DOE and the federal government can support getting hydrogen to scale.

Mr. Elliott replied that hydrogen should play a complementary role to liquified natural gas and should be blended at higher levels in natural gas infrastructure. Gas pipelines can be used for hydrogen storage. Mr. Elliott spoke about an emerging technology to separate hydrogen and natural gas within a pipeline. He said that DOE is already a leader when it comes to hydrogen and that he is encouraged by the Department's actions. Mr. Elliott said that it would be helpful for DOE to conduct system-specific studies.

Q3. Paul Cicio, Industrial Energy Consumers of America, spoke about the impacts of hydrogen in the manufacturing sector and asked DOE to look into this.

Mr. Elliott agreed that the impacts of hydrogen integration in the manufacturing sector need to be further examined. He said that some of Enbridge's customers are wary of hydrogen blending because they are unsure of the potential impacts.

Ms. Manger said that there has been a lot of research to get to where they are now and that there is still more needed. This emphasizes the theme that as hydrogen becomes more widely adopted, technology development will also improve.

Ms. Espinoza said that hydrogen's volume density is one-third of that of natural gas. This means that if all natural gas pipelines were filled with only hydrogen, there would be only one-third of the energy potential of natural gas. Ms. Espinoza brought up several engineering factors that need to be considered for hydrogen blending.

Mr. Galjee said that Nouryon is working with a Dutch gas utility to build out hydrogen pipelines. He suggested natural gas pipelines be used for storage.

Mr. Rutkowski discussed the large role natural gas plays for storage. He discussed some of the implications of natural gas being taken offline and replaced with hydrogen.

Q4. Mr. Koplin asked about the feasibility of salt caverns as a storage option for hydrogen.

Mr. Rutkowski replied that it is still early, but salt caverns seem to be effective. There are other engineering questions that need to be looked into.

Mr. Galjee replied that most of the hydrogen being produced is used quickly, so there is low need for storage at this point. He suggested that DOE look into hydrogen storage options.

Q5. Mladen Kezunovic, Texas A&M University, asked how water supply related to this conversation.

Ms. Espinoza replied that water use will depend on how hydrogen is created. She provided statistics about water use in the electricity sector and how that would change if hydrogen production increases.

Mr. Galjee said that Nouryon views water as a feedstock and that new value streams for water are arising.

Q6. Flora Flygt, American Transmission Company (Ret.), asked how much energy consumption can be reduced by using hydrogen. She also asked about the flexibility of hydrogen integration for use in a decarbonized society.

Mr. Rutkowski said that GTI's LCRI is looking into areas where hydrogen would be most effective.

Mr. Galjee said that hydrogen showcases the importance of a simultaneous increase in scale and creation of value chains. He suggested that the adoption of hydrogen should be looked at in the context of value chains.

Ms. Manger said that there would be optionality of fuel use in a perfect world, but often this is not the case.

Ms. Espinoza spoke about the importance of looking at hydrogen adoption across the entire economy rather than in any specific sector in isolation. Decisions at the sector level have ripple effects throughout the entire economy. Ms. Espinoza warned that all models should have increased transparency because there are certain factors that models cannot account for.

Q7. Ms. Reder asked how the panelists are considering and preparing for the speed at which systems need to change to achieve sustainability goals.

Ms. Espinoza replied that in the next decade, the rate of change will be three times what it has been in the past 15 years. She said that DOE can be agnostic when looking at different technologies and to try to plan backward from the end goal. Ms. Espinoza spoke of the importance of collaboration and sharing as opposed to individual entities doing similar models of already established work.

Mr. Galjee said that the conversation needs to shift toward focusing on the benefits and overall impacts of a hydrogen economy rather than focusing on the costs.

Mr. Elliott added that it is important for energy suppliers to understand the policies in place for hydrogen and use these policies to their advantage.

Subcommittee Update: Energy Storage

Subcommittee Chair Lola Infante relayed a message from Neha Rustagi, DOE Office of Hydrogen and Fuel Cell Technologies, that DOE launched its Hydrogen Earthshot Initiative and issued a corresponding request for information. In April 2021, the EAC approved the 2021 Energy Storage Plan developed by the subcommittee. Dr. Infante said that the subcommittee will tackle power-to-gas, energy storage operations and benefits, and evaluate DOE's energy storage programs under the new administration. The subcommittee will also look into potential recommendations emerging from the meeting's panel "Working Together Toward a Sustainable and Resilient Zero Carbon Emission Future: Hydrogen, Batteries, and Natural Gas."

Subcommittee Update: Smart Grid

Subcommittee Vice-Chair Darlene Phillips, PJM Interconnection LLC, provided an overview of the State-Federal Coordination work product. The EAC unanimously approved the State-Federal Coordination work product.

Subcommittee Chair Tom Bialek, San Diego Gas & Electric Company, reviewed ongoing initiatives, including the Section 8008 Voluntary Model Pathways initiative and efforts related to developing a work product on resiliency. Dr. Bialek brought up several current events that emphasized the importance of addressing resilience using an all-hazards approach.

Subcommittee Update: Grid Resilience for National Security

Subcommittee Chair Paul Stockton discussed the subcommittee's efforts on the defense critical electric infrastructure (DCEI) recommendations and blackstart restoration for national security work product. He said that they have nearly completed the stakeholder information gathering phase for the DCEI report. Dr. Stockton listed a few of the recommendations that will be included. Regarding the blackstart report, Dr. Stockton is working with Ms. Reder on how to go about crafting recommendations. Dr. Stockton gave a preview of the subcommittee's Emerging Resilience Frameworks and Assessment Tools panel.

Joy Ditto, American Public Power Association, spoke about the importance of the pending subcommittee work products and the real-world impacts they will have for grid security.

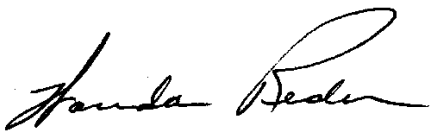
Wrap-Up and Adjournment of Day 1

Mr. Lawrence and Ms. Reder thanked Ms. Denbow for moderating the Zero Carbon Emissions Future panel and thanked the panelists for their participation.

Deputy Assistant Secretary Manary provided closing comments summarizing the panel session and how DOE can continue its collaboration with industry.

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

8/11/2021
Date

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

8/11/2021
Date

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

8/11/2021
Date