



**U.S. Department of Energy
Electricity Advisory Committee Meeting**

**National Rural Electric Cooperative Association Conference Center
Arlington, Virginia
June 5, 2024 Day 1**

Meeting Summary

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Meeting Overview

The Electricity Advisory Committee's (EAC) second meeting of 2024 was held June 5 and 6 using a hybrid format at the National Rural Electric Cooperative Association conference center in Arlington, Virginia, with the option of virtual participation via the video conferencing platform Webex. On the first day of the meeting, Chris Irwin, a Program Manager from the U.S. Department of Energy's (DOE) Office of Electricity (OE) provided a presentation and facilitated discussion on electric sector data. Then, Dr. Barry Mather, a Chief Engineer from the National Renewable Energy Laboratory (NREL), gave a presentation on NREL's monitoring of and findings from the 2024 solar eclipse. Following that presentation, Tom Bialek and Bob Cummings (both EAC members) provided an update and facilitated a conversation on the Institute of Electric and Electrical Engineers (IEEE) standards. Then, Tom Bialek and Rick Mroz (both EAC members) presented the "*Natural Gas and Electric Critical Infrastructure Coordination*" work product and association EAC recommendations. The EAC unanimously voted to pass the recommendations in that work product. Finally, the three EAC subcommittees briefed the group on their initiatives and work products, and Wanda Reder adjourned the meeting.

All presentations and the EAC recommendations can be found on the EAC website at [Electricity Advisory Committee June 2024 Meeting | Department of Energy](#).

Welcome, Call to Order/Roll Call, and Introductions

Jayne Faith, EAC Designated Federal Officer, welcomed attendees, took attendance, covered several housekeeping items, and officially called the meeting to order. EAC Chair Wanda Reder outlined the agenda across both days and noted that 11 EAC members would be terming off after this meeting because they had all reached their six year limit for serving.

Introductory Remarks from DOE Office of Electricity (OE)

Principal Deputy Assistant Secretary (PDAS) Bindewald presented OE's key accomplishments since February 2024. He noted that OE is deploying creative forms of funding to advance innovative ideas about how to understand technologies in all their applications. Some initiatives that PDAS Bindewald noted included:

- Science Synthesis Prize
- Power Sector Transmission and Distribution Data and Information workshop report, and Digitizing Utilities Prize
- Integrated Distribution System Planning
- Flexible Innovative Transformer Technologies FOA
- Silicon Carbide Packaging Prize
- Advanced Conductor Scan Report
- Reconductoring Economic Financial Analysis (REFA) Tool
- Community Support Projects

- Port electrification handbook: A Reference to Aid U.S. Port Energy Transition

PDAS Bindewald said that these initiatives build on insights from the EAC. Presenter slides can be found online via the link provided in the Meeting Overview section above.

Discussion:

Lisa Frantzis noted that it would be helpful to see each EAC recommendation directly linked to actions taken. She suggested the following dispositions: implemented, no action taken and why, no further action needed, and resolved.

Assistant Secretary Rodrigues expressed appreciation for guidance and direction the EAC. He mentioned it was Public Service Recognition Week, and thanked all of the EAC members for their service and noted his appreciation to the 11 members that are terming off. Assistant Secretary Rodrigues then provided those 11 members the opportunity to express their parting thoughts to the EAC and DOE to help inform future priorities.

Wanda Reder noted that complexity, uncertainty, risk of transformation should be met with flexibility, adaptability, and visibility. Technology and innovation should contribute to resiliency and reliability. DOE can play a role in the following areas:

- Convening stakeholders in an ongoing and systematic way to work on resiliency and reliability.
- Aligning future goals with the current reality to inform actionable and impactful steps.
- Determining leading indicators and priorities.

Ms. Reder noted that mutual aid networks, following Hurricane Sandy, established roles and responsibilities that DOE can build upon to ensure that stakeholders have the right information at the right time. She also referenced recommendations in the reliability work product for DOE to implement.

Clay Koplin noted resource adequacy as a priority for DOE, OE, and the EAC. The electric grid is experiencing the greatest state of disruption since the grid was built. He noted that the industry should focus on delivering reliable, affordable, and sustainable energy that does not leave anybody behind.

Bob Cummings noted that challenges facing the industry have changed over the past ten years, and the quality of EAC members continues to improve. The EAC can support OE in key priorities. He noted the following priorities:

- Standards should be accurate and constructive
- DOE should address the current state of reality and focus on actionable, current-day initiatives.

Tom Bialek said that a key question is why the energy transition has not progressed as quickly as it could have. This question can inform where DOE places effort. DOE should distinguish between an ideal future state and actual actions that the industry needs to take to advance the transition.

Darlene Phillips noted that the value of the EAC is the diversity of trades, sectors, and people. Because of this diversity, the EAC is able to come up with a set of solutions that work because they represent stakeholders. Ms. Phillips said that it is easy to be distracted by new technologies. However, DOE and the EAC should consider whether new technologies will be adopted and work in practice.

Rick Mroz suggested that DOE and the EAC support identifying gaps relative to states. There is a large amount of interconnection between Federal bulk power systems and state distribution systems. DOE can also coordinate with other Federal agencies, since any Federal resources that can support the energy transition will be helpful.

Drew Fellon said that he hopes the EAC will continue to involve high quality industry professionals and noted that the EAC should not forget about customers and natural gas stakeholders. He added that utilities and customers want to convene and DOE can help with that. He reminded DOE to not forget about existing EAC work products and recommendations.

Chris Ayers said that the value of the EAC lies in injecting real-world operational experience into DOE research. This includes operational experience in the regulatory space, and it is critical to engage statutory consumer advocates and utility commissions in the EAC. Ultimately, key initiatives from the EAC and DOE have to be understood and internalized by regulators to improve cost recovery. Mr. Ayers also encouraged the EAC and DOE to use time effectively, and to track and report on the disposition of EAC work products to evaluate the EAC's impact.

Delia Patterson urged DOE to continue to empower the EAC to provide actionable recommendations and influence DOE's direction. DOE should keep the EAC focused on impactful areas. Ms. Patterson thanked DOE and expressed her appreciation for the committee.

Assistant Secretary Rodrigues thanked the 11 members terming off of the EAC and noted that under rapidly evolving conditions and during a difficult energy transition, the EAC represents the subject matter experts who know the energy industry on an operational level. This representation will help to advance technology, reliability, resilience, and other aspects of the energy transition. He noted OE's commitment to taking EAC recommendations seriously to advance progress in the energy transition.

OE Presentation and Facilitated Discussion on Electric Sector Data

Chris Irwin delivered a presentation on key aspects of Electric Sector Data and facilitated a discussion divided into four parts:

- Electric Sector Data Context
- Sector Strategy and Secure Data Portal
- Data Use and Protection
- Conclusion and Discussion

Presenter slides can be found online via the link provided in the Meeting Overview section above.

Electric Sector Data Context

Chris Irwin presented information that included, but was not limited to data types, sources, granularity, and focus across the past, present, and future in the electric sector. He presented past and projected future trends on grid data production from 1950-2040; noted that within five to six years the grid will produce exponential growth in data, further increased by distributed energy resources while energy production on the grid will merely double; that OE is trying to develop a strategic understanding and effort related to data management, given these projections; how to mathematically guarantee data privacy; noted international data strategies from the European Union, Australia, and United Kingdom; noted that the data space can help to advance the energy transition by providing architecture to increase efficiency in asset and systems operations; noted that data should move through verified processes; and noted the need to think about collaboration across data interfaces.

Discussion:

Tom Bialek noted the need for a data roadmap, and referenced legal roadblocks and ramifications associated with data sharing. He also noted the need to remedy data asynchronicity between data sources.

Chris Irwin agreed that technical and legal innovations are needed to synchronize data from heterogeneous silos. We need to be able to operate data in a 60 Hz environment. Some secure communications organizations have synchronization capabilities for data from different sources and environments, but more innovation is needed.

Daniel Brooks asked whether DOE aims to develop a DOE-controlled data platform.

Chris Irwin clarified that DOE's role would likely be to teach how to create secure data portals, and DOE would not control data portals.

Daniel Brooks noted the many sensitivities associated with sharing data where forecasted loads might show up. These sensitivities include commercial interests, intellectual property, personally identifiable information, and more. Data centers are reluctant to share information. Additionally, personally identifiable information is particularly prevalent in in-use consumption data needed for the grid edge and presents significant legal constraints.

Chris Irwin agreed that each stakeholder has a different level of sensitivity in its data. Operational, corporate, and commercial sensitivities are all unique, and each data owner's sensitivities should be respected.

Daniel Brooks noted that as data is aggregated, different stakeholders will desire to use data for additional purposes. In the data governance process, regulators should develop guidelines for data use for unintended purposes which can correspondingly have unintended consequences.

Chris Irwin agreed that such regulations are needed and surmised that stakeholders would not share data without assurances in place that data should not be used for unintended purposes.

Jay Morrison said that third party cloud and artificial intelligence services are needed to transform raw data into meaningful insights for decision-making. He voiced two concerns about these services and their ability to protect data:

- Cloud and artificial intelligence services may not be developed specifically for data sharing in the energy context
- Large companies will own cloud and artificial intelligence services and smaller energy companies will not be able to negotiate terms to protect data and will not be able to conduct audits to ensure the data is secure. He noted that data owners need confidence that data is protected, and worried that data owners might not provide data to large companies.

Rick Mroz said that many locales do not have advanced metering infrastructure or distribution backbones and added that the rate of adoption will not be uniform across the country. He asked if these realities cause distortions across Chris Irwin's projections of data to 2050.

Chris Irwin said that the numbers in his presentation are conservative and predicated on 40% of meters being Advanced Metering Infrastructure 2.0 capable.

Delia Patterson noted that she saw the phrase "develop functional data ecosystem" on one slide. She asked whether that encompassed DOE helping to create greater edge computing solutions.

Irwin said that the magnitude of data creation at the edge of the grid may be large enough that it would be wise to operate on data at the grid edge. OE has a research opportunity to strategically articulate the 'distribute and compute' needs.

Lynne Kiesling noted that one difficult concept in the secure data portal and data sharing discussion is the restriction of data access that has anti-competitive effects and constitutes an entry barrier. That point means that both achieving agreement to participate and writing the data portal rules will be crucial parts of implementing this idea.

Bob Cummings noted challenges with the legal side of data sharing. He noted a use case in which his organization needed data to analyze inverter-based resources, and it took three and a half months to obtain the data from lawyers. This poses a challenges in pulling data following disturbances for event analyses. This process may be more resource intensive that it is worth.

Howard Gugel said that the rapid evolution of the grid makes developing accurate projections difficult.

Chris Irwin agreed that linear projections cannot be used anymore because of how unpredictable grid evolution is. Strong use cases are helpful with projections.

Andrew Barbeau noted that it is important to consider the purpose of the data. The cost of measurement can cost more than the benefit of providing analyses, and the latency of findings can exceed decision timeframes.

Erik Takayesu noted that with or without advanced metering infrastructure, grid edge and distributed artificial intelligence via meter collars, smart homes and panels will create the need for a comprehensive roadmap or framework on data gathering, storing, and use for planning and

operations. There are increasingly blurred lines between utilities, end users, and third parties when it comes to data ownership.

Chris Irwin noted that the government and industry have the ability to create extremely secure data sharing environments (e.g. sensitive compartmented information facilities) but those environments are unusable to most people. Stakeholders need versions of data based on need-to-know to fulfill the promise of empowering the data economy.

Sector Strategy and Secure Data Portal

Chris Irwin presented additional slides on examples of data portals, considerations for using data strategies from the European Union, Australia, and the United Kingdom to incorporate governance, privacy, sensitivity, and other issues into a U.S. Data Strategy; uses of data portals for governance and interoperability and how we can ingest data to create insights and value; transforming data from siloed sources into useable and accessible data; and policy governance considerations.

Discussion:

Lynne Kiesling noted that Chris Irwin described creating a data joint venture. She noted a preponderance of both academic research and industry practice in a range of industries and applications about joint venture governance frameworks. Ms. Kiesling can share information on those resources for the governance aspect of this work.

Tom Bialek noted that utilities have different naming conventions which causes terminology issues. DOE could play a role in defining base elements, their meanings and derivations, and define how to update data sources, keep data clean and accurate, and update data sources.

Mario Hurtado noted that developers and the public do not always know what they need in terms of data. This might make it difficult to provide useful data to the public but not compromise security. It is important to define respective stakeholder needs.

Chris Irwin agreed with the need for a methodical way to arrive at a discussion about data sensitivity and identify scenarios that serve the most use cases possible and leaves out cases with sensitivity issues. Each data source will require repeatable discussion.

Howard Gugel noted his concern that bad actors with access to analyzed data can cause harm.

Chris Irwin noted that many data sources, when analyzed into insights, can be used for harmful purposes: GPS data is an example of a data source that used to be top secret and is publicly available now. Now, nuances with which users can protect GPS data on bi-application basis provides information on how to protect other forms of data.

Darlene Phillips noted that users would think twice about their need-to-know regarding data sources if data sources had an associated cost. The EAC can recommend that DOE help to establish, in collaboration with industry stakeholders, a need-to-know baseline. There should also be a baseline for required metadata, since developing metadata for all available information is an overwhelming amount of work.

Clay Koplin noted that his organization has several different data streams and data resolutions for their operating data. As they add sensors, sometimes they will have functionality that duplicates another functionality, so they started trying to develop at least two data sources for each critical operating data point. These different data sources can be used for triage. For example, if a transformer is overloaded, rather than tripping it offline, you could triage the situation with two independent data sources and have some redundancy and added security. He noted that some transformer sensors and distribution sensors have wildfire packages. This provides opportunities to share data platforms with emergency services.

Chris Irwin agreed that multiple data sources for different purposes that tell the same thing can be used to validate against each other.

Data Use and Protection

Chris Irwin then presented on data use and protection. In this segment of the presentation, he noted that as data uses and users grow, usability lags; he listed existing efforts for data interoperability and sharing from DOE and other entities; noted that raw data must be transformed into usable data and not many people need full fidelity data; data cleaning practices will become increasingly important and labor intensive; and discussed emerging advanced data protection methods. Presenter slides can be found online via the link provided in the Meeting Overview section above.

Discussion:

Tom Bialek noted that malfunctions such as sensors going down can lead to data gaps. This raises the question of how to fill those data gaps, and whether there is a way to fill the data gaps with data from other sensors. This could also have additional benefits for running certain algorithms that also need sensor data. The state of California required providers to make capacity maps public. Providers did so through an opt-in system and found that very few vendors signed up to view capacity maps. However, foreign countries did sign up to view capacity maps. A regulatory framework could be helpful here. The utility commission did not seem concerned. Mr. Bialek also noted that open source software can inadvertently open backdoors to bad actors.

Chris Irwin noted that data sharing environments are not necessarily data disclosure environments; if you share raw data, it is shared forever; and data should not be operated upon in unclean environments.

Darlene Phillips noted that it took an act of Congress to convene security, cloud governance, and vendor stakeholders to develop a cloud-based solution. It may be difficult to alter perceptions of cloud-based solutions in the energy sector. Stakeholders who do not understand the technology think that nothing important should be stored in the cloud. It will be important to change the narrative of cloud-based solutions in the industry.

Chris Ayers referenced Chris Irwin's challenges with solving customer data access issues regarding Green Button initiative. He asked Chris Irwin to elaborate on what the challenge was and the hurdle to overcome.

Chris Irwin said that when DOE conducted the Green Button initiative, data sharing, data sharing standards, and data sharing technology were young. There was no certification process for Green Button data access. Since then, standards have matured and mechanics of data sharing have

improved. However, utilities are still uncomfortable in the role of data service providers, which presents a cultural issue. Additionally, the fears associated with data sharing are unresolved. There is also real or perceived legal risk with data sharing.

Assistant Secretary Rodrigues noted the following two themes as hurdles to data sharing:

- There is a need to identify use cases for data sharing that make sense to utilities and present the value derived in sharing information
- The role of utilities is shifting, and as data service providers, there is additional legal risk. Utilities have obligations to customers and data.

Assistant Secretary Rodrigues added that as utility data grows, customer data also grows.

Wanda Reder added that utilities are stewards for data privacy, and data from the grid edge raises additional questions regarding governance and privacy.

Andrew Barbeau noted that it is important to think through how to allay fears related to the cloud. He transitioned the conversation to how the EAC could provide recommendations and input to DOE regarding secure data sharing and portals. He noted that the EAC is trying to translate presentations into work products, and asked the EAC members to think through the problem statement, gaps and needs, and where the EAC perspective would be most helpful.

Chris Irwin said that DOE knows how to pursue technical initiatives. However, the EAC could be helpful weighing in on legal and governance ideas and initiatives. Mapping stakeholders and areas of need is helpful. He surmised whether interactions with customers, third parties, and/or transmission interfaces might pose areas of need.

Bob Cummings noted if you cannot connect to the cloud, you cannot conduct cloud computing.

Darlene Phillips noted that the cloud is appropriate for some data, but not all. The cloud is inappropriate for data that stakeholders need frequently. However, there is a large portion of data that is not needed in real time that can live in the cloud.

Lynne Kiesling noted that this complicated technical topic is a good one on which to convene workshops among the various stakeholders who are at different levels of technical understanding.

Howard Gugel noted that there is a difference between data analytics and decisions and actions taken based on data analytics. This is an important consideration regarding use cases which help to identify the proper decision point to take an action based on an analysis.

Daniel Brooks warned the EAC and DOE not to underestimate the time it takes to conduct analyses in a protected whitespace environment. He added that governance is needed for data analytics use cases. Data from multiple sources that is analyzed into new data could result in adverse and unintended consequences.

PDAS Bindewald noted that part of reliability in the future will be gaining trust with data that does not originate with utilities, such as grid edge data. He noted the unknown consequences if credibility and trust is broken between consumers, utilities, and grid edge operators. Ensuring data reaches appropriate locations for appropriate and secure use is important.

Tom Bialek noted that third parties have refused to share data in the past.

Chris Irwin said that data sharing needs to be negotiated—stakeholders should know how data sharing benefits them.

Discussion on Solar Eclipse Analysis and Findings

Dr. Barry Mather from NREL presented on the joint project that monitored and analyzed the April 8, 2024, solar eclipse. He discussed the differences between the 2017 eclipse and the 2024 eclipse in terms of methodology, proliferation of solar energy, and modeling approaches, and presented the findings and implications from the 2024 solar eclipse.

Presenter slides can be found online via the link provided in the Meeting Overview section above.

Discussion:

Delia Patterson asked how accurate the predictions about the reduction in solar generation were, and what that tells us about our forecasting capabilities.

Dr. Mather said that the analysis at the beginning was a clear-sky analysis that estimated 15.2 gigawatts of loss. Texas ended up having 13.6 Gigawatts of loss. The ramp rate was slightly higher than predicted. Analysis at the beginning was a clear sky analysis (planning happens in advance); estimated 15.2 Gigawatts of loss, and Texas ended up with 13.6 Gigawatts of loss. The ramp rate was slightly higher than predicted. NREL is looking at forecasting characteristics like cloud cover in a post-event analysis.

Daniel Brooks asked whether Dr. Mather heard of any utilities procuring additional resources for this event, or whether they planned with a standard allotment of resources.

Dr. Mather said that he did not know if utilities procured additional resources, but it seemed like they had adequate reserves for the solar eclipse.

EAC Discussion/Update on the Institute of Electric and Electrical Engineers (IEEE) Standards

Bob Cummings and Tom Bialek presented on IEEE standards. Bob Cummings went over different versions of IEEE standards and provided updates on the status of the 2030 standards. Bob Cummings noted that IEEE standards are not required. Rather, they have to be adopted by states or regulatory commissions to be applied and enforced. IEEE 2030 Standards are under development. Tom Bialek noted that functionality should be consistent across the fleet of devices and the standards support that consistency

Presenter slides can be found online via the link provided in the Meeting Overview section above.

Darlene Phillips asked how virtual power plant standards differ from 2222 standards.

Bob Cummings said that the tenets of 2222 have to comply with nodes. If there are resources not controlled by a virtual power plant, they would not be applicable to virtual power plant standards. Rick Mroz asked if the 2800 framework would apply to assets under the 2222 standards or whether they are referred to as virtual power plant assets.

Bob Cummings asked who is responsible for what at what level. He questioned whether the virtual power plant or distribution system operator should be responsible at the distribution level.

Darlene Phillips said that the control question has to be answered. Aggregators should go through local utilities.

Delia Patterson asked if there have been successful demonstrations of virtual power plants being used as black start.

Bob Cummings replied that there has not, and that he would like to work with the labs for proof of concept.

Tom Bialek said that some microgrid demonstrations lay the foundation for trying to use virtual powerplants as black start capabilities, but aggregating this in the market would be helpful.

Mario Hurtado asked whether Bob Cummings and Tom Bialek examined the need for standards or protocols regarding which transmission studies need to be done for specific configurations.

Bob Cummings said that the goal is to conduct enough studies at the transmission and sub-transmission level to identify any node and pitch point in the planning phase.

Howard Gugel noted that there are not many requirements for virtual power plants to have grid-forming inverters so these studies may be hard to model. It would be interesting to see the methodology for testing the concept around virtual power plants and black start.

Darlene Phillips noted that on an earlier slide, Bob Cummings mentioned that a virtual power plant cannot be larger than a balancing authority. She noted that virtual power plants cannot be as big as balancing authorities. She asked when a virtual power plant is too large.

Daniel Brooks said that virtual power plant is not an accurate term. It has a specific connotation that will not go over well.

Rick Mroz asked if there are any revisions in operations for distribution and transmission. He inquired whether something needs to change in the regulation of distribution systems to harmonize the grid. Regulators will have to adapt with changes to oversight of operations.

Bob Cummings noted that aggregated power cannot be sold across geographies, and the nuanced questions, such as providing specific neighborhoods with specific services are more difficult.

Howard Gugel asked if a Distributed Energy Resource Management System (DERMS) can be in a virtual power plant.

Daniel Brooks noted that a DERMS is a management-controlled software, not an aggregation and

not a virtual power plant.

Assistant Secretary Rodrigues noted that people think about virtual power plants as local power and not about how to contribute to the grid and manage the grid in a more intelligent and efficient way. If we are going to use the phrase ‘virtual power plant’, we will need to integrate it into the vocabulary market alongside phrases such as ‘Demand is the new supply’. The industry needs to think about how to make demand a part of managing the energy system. He noted that we need to stop celebrating the potential of the grid edge and take actionable steps to make it work.

Wanda Reder noted that to get it into the marketplace, there is sometimes difficulty adopting the standards despite the work that goes into them.

Natural Gas/Electric Critical Infrastructure Coordination

Wanda Reder introduced the “*Natural Gas and Electric Critical Infrastructure Coordination*” work product to the full EAC. Kimberly Denbow provided a pre-recorded video explaining the work product and its intentions. Rick Mroz described ongoing efforts in the natural gas/electric coordination space and encouraged DOE to convene stakeholder to advance coordination. Tom Bialek went through the key points of the work product and discussed the iterative review that took place. He also mentioned that the Smart Grid Subcommittee had reviewed, discussed and voted out the work product with changes.

The work product can be found online via the link provided in the Meeting Overview section above.

Wanda Reder put the “*Natural Gas and Electric Critical Infrastructure Coordination*” work product forth for a full EAC vote. The EAC voted unanimously to approve it.

Gene Rodrigues thanked and congratulated the EAC on the common-sense and productive recommendations provided. He asked the EAC to remain productive and vigilant in holding DOE accountable and continue putting forth great work products. He noted that he looked forward to the EAC putting this work product forward publicly.

Wanda Reder endorsed the EAC work product development model proposed by Andrew Barbeau: EAC members should use Full EAC presentations to develop clear problem statements to frame work products. Then, EAC members should collect key considerations from other EAC members to further frame the work product. Then, EAC members should, as part of a subcommittee or task group, develop a work product for the next full EAC meeting. Ms. Reder encouraged members to identify key takeaways following EAC meetings, a problem statement, and then thinking about how those problem statements can translate into work products.

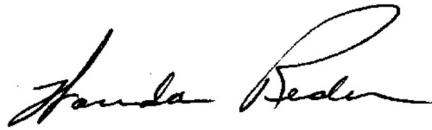
Andrew Barbeau noted that one of the best parts of the Natural Gas/Electric work product was that it was formed swiftly and should serve as a model. The speed and pace of the problem must be matched by the speed and pace of the effort.

Wrap-up and Adjourn Day 1 of June 2024 Meeting of the EAC

Wanda Reder closed out the day. She noted several housekeeping items for Day 2, and thanked the group for their participation.

Signature Page

Respectfully Submitted and Certified as Accurate,



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

June 28, 2024

Date



Clay Koplin
Cordova Electric
Chair
DOE Electricity Advisory Committee

June 30, 2024

Date



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

July 1, 2024

Date