U.S. Department of Energy
Electricity Advisory Committee Meeting

National Rural Electric Cooperative Association Conference Center

Arlington, VA

June 8, 2022

Day 1 Meeting Summary

CONTENTS

Day 1 Participants

Electricity Advisory Committee Members

CHRISTOPHER AYERS
North Carolina Utilities Commission Public Staff

LAUREN AZAR
Azar Law, LLC

ANDREW BARBEAU
The Accelerate Group, LLC

TOM BIALEK
Toumetis

DANIEL BROOKS
Electric Power Research Institute

JENNIFER CHEN
ReGrid

JEFF COOK
Bonneville Power Administration

ROBERT CUMMINGS
Red Yucca Power Consulting

KIMBERLY DENBOW
American Gas Association

DREW FELLON
Alliance Advisory Services

SARI FINK
American Clean Power Association

LISA FRANTZIS
Guidehouse

SHERI GIVENS
National Grid

BRIAN HARRELL
Avangrid

PHIL HERMAN
Blink Charging

MICHAEL HEYECK
The Grid Group, LLC

MARIO HURTADO
LUMA Energy, LLC

LOLA INFANTE
Electric Power Research Institute

LYNNE KIESLING
University of Colorado-Denver College of Engineering, Design and Computing

CLAY KOPLIN
Cordova Electric Cooperative

BRIAN LIPSCOMB
Energy Keepers, Inc.

REP. NICOLE LOWEN
Hawaii House of Representatives

MONICA MARTINEZ
Ruben Strategy Group, LLC

JESSICA MATTHEWS
Uncharted Power, Inc.

JAY MORRISON
ElectriCities of North Carolina, Inc.

RICHARD MROZ
Resolute Strategies, LLC

DON PARSONS
Georgia House of Representatives

DARLENE PHILLIPS
PJM Interconnection, LLC

WANDA REDER
Grid-X Partners, LLC

PAUL STOCKTON
Paul N. Stockton, LLC

TOM WEAVER
American Electric Power Company, Inc.

Registered U.S. Department of Energy (DOE), National Laboratories, and Power Marketing Administrations

ELIZABETH ARNOLD
Office of Electricity, U.S. DOE

ALISSA BAKER
Bonneville Power Administration

GIL BINDEWALD
Office of Electricity, U.S. DOE

ADRIA BROOKS
Office of Electricity, U.S. DOE

SHAWN CAMPBELL
Office of Electricity, U.S. DOE

JAYNE FAITH
Office of Electricity, U.S. DOE

ALI GHASSEMIAN
Office of Electricity, U.S. DOE

ERIN GREEN
Western Area Power Administration

HAMODY HINDI
Office of Electricity, U.S. DOE

DAVID HOWARD
Office of Electricity, U.S. DOE

GREGORY HYSON
Office of Electricity, U.S. DOE

SANDRA JENKINS
Office of Electricity, U.S. DOE

JOYCE KIM
Office of Electricity, U.S. DOE

KATHERINE KONIECZNY
Office of the General Counsel, U.S. DOE

CHRISTOPHER LAWRENCE
Office of Electricity, U.S. DOE

TRACEY LEBEAU
Western Area Power Administration

TERRI LEE
Office of Electricity, U.S. DOE

MARC LEMMOND
Office of Cybersecurity, Energy Security, and Emergency Response, U.S. DOE

KEVIN LYNN
Office of Energy Efficiency and Renewable Energy, U.S. DOE

MICHELLE MANARY
Office of Electricity, U.S. DOE

CARL MAS
Office of Electricity, U.S. DOE

WHITNEY MUSE
Office of Electricity, U.S. DOE

KRISTIN NAWOJ
Office of Electricity, U.S. DOE

FERNANDO PALMA
Office of Electricity, U.S. DOE

ANDRE PEREIRA
Office of Electricity, U.S. DOE

RUSTY PERRIN
Office of Electricity, U.S. DOE

MARK RICE
Pacific Northwest National Laboratory

GERALDINE RICHMOND
Office of the Undersecretary for Science and Innovation, U.S. DOE

PAUL SCHWABE
Western Area Power Administration

MERRILL SMITH
Office of Electricity, U.S. DOE

DIONNE THOMPSON
Western Area Power Administration

SAM WALSH
Office of the General Counsel, U.S. Department of Energy

DAVID WELLS
Office of Electricity, U.S. DOE

JESS WILLIAMS
Western Area Power Administration

CYNTHIA WILSON
Office of Electricity, U.S. DOE

KERRY WORTHINGTON
Office of Energy Efficiency and Renewable Energy, U.S. DOE

Registered Speakers, Guests, and Members of the Public

SAM ADOBO
Squire Patton Boggs

KARA ALLEN
Congress

ERIC BARNES
Motorcycle Industry Council

DAN BELIN
VHB, Inc.

JAMIE BOND
PA Consulting

FERNANDO BOWEN
FAB Technologies

BEN BRINT
Tesla

TANYA BURNS
Arara Blue Energy Group

JANICE CEPERICH
Government Accountability Office

RAFIK CHERNI
STEG

LELAND COGLIANI
Lewis-Burke Associates

MICHAEL DEXTER
SSDN

REBECCA DUBE
CT DEEP

HECTOR FALCON
U.S. Space Force

TIFFANY FINCK-HAYNES
SMART Union

S WILLIAM GOUSE
SAE International

ANTHONY HALL
Northeastern University

MIKE HANCOCK
Ansys

KATIE HART
ClearPath

MORGAN HIGMAN
CSIS

MELISSA HORTON
Southern Company

JOHN HOWES
Redland Energy Group

ETHAN HOWLAND
Industry Drive

DAVID HUNTER
Electric Power Research Institute

VICTOR IBARRA
Nuclear Innovation Alliance

CHRIS JOHNSTONE
Guidehouse

JOHN KOTEK
NEI

LAURA MANZ
Guidehouse

MATT MCKNIGHT
R&R Partners

DAVID MEYER
Retired

WILSON MONTJOY
The Smith-Free Group

DANIEL MOORE
Bloomberg

JACQUELINE ORFIELD
Squire Patton Boggs

LOPA PARIKH
Edison Electric Institute

ANTHONY PETTI
Guidehouse

BILL PFISTER
Edison Electric Institute

ANANTH PHARSHY
Prime Coalition

RAJAT PUNGALIYA
Pine Gate Renewables

LUKE ROSE
Malta Inc.

SANDRA SAFRO
Edison Electric Institute

SCOTT SCHLOEGEL
Motorcycle Industry Council

JAMIE SIMLER
Ameren

DENICE SIMPSON
Ameren

MICHAEL SKELLY
Grid United

HALE STOLBERG
Lewis-Burke Associates

NICK TOBENKIN
Quanta Services

MARY TOLER
Battelle

DAVID TOWNLEY
CTC Global

SARAH VILMS
Squire Patton Boggs

JARROD WEST
Government Accountability Office

CAITLIN WILLIAMS
Huntsville Utilities

LEET WOOD
Edison Electric Institute

GLENN YAMASAKI
No Kai Oi Energy LLC

Registered ICF/Support

MARK GIFFORD
SIDEM

DANIEL GRAY
ICF

JOSH SMITH
ICF

Meeting Overview

The EAC's second meeting of 2022, on June 8 and 9, was held in a hybrid format at the National Rural Electric Cooperative Association building in Arlington, Virginia, and via the video conferencing platform Webex. On the first day of the meeting Gil Bindewald, Acting Principal Deputy Assistant Secretary (PDAS) for the U.S. Department of Energy (DOE) Office of Electricity (OE), provided an update on OE programs and initiatives. An update on Bipartisan Infrastructure Law implementation was provided by Dr. Geri Richmond, Under Secretary for Science and Innovation (US) at DOE.

The EAC held two panels on the first day of the meeting. The first, titled "National Transmission Planning Study (NTPS) Presentation," involved a presentation from DOE on its efforts related to the NTPS, which is a part of DOE's broader Building a Better Grid Initiative.[1] The second panel, titled "DOE Authorities for Transmission Deployment," included presentations from DOE, the Bonneville Power Administration, the Western Area Power Administration, and Grid United. Both panels were followed by lengthy discussion among EAC members and panelists.

All presentations, as well as recordings of the meeting, can be found at https://www.energy.gov/oe/events/june-8-9-2022-meeting-electricity-advisory-committee.

Welcome, Call to Order, Introductions, and Developments Since Last Meeting

Chris Lawrence, 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 invited PDAS Bindewald to provide an update on OE's programs and initiatives.

Update on DOE Office of Electricity Programs and Initiatives

PDAS Bindewald overviewed a variety of areas of DOE effort that have been influenced by EAC input, including modeling, energy storage, and microgrids. He referenced the new Joint Office on Energy and Transportation that has been working with various stakeholders to apply lessons learned to build more electric vehicle charging infrastructure. The Joint Office is a collaboration between DOE and the Department of Transportation and was created by the Bipartisan Infrastructure Law (BIL). DOE has released three new reports associated with its Voices of Experience initiative,[2] which collects the experiences, insights, and lessons learned by experts in the energy sector. The three new reports are on microgrids for resiliency, the transition to electrified transportation, and next generation technologies. PDAS Bindewald concluded by reading several excerpts from the first EAC meeting in 2008.

[1] DOE. "Building a Better Grid Initiative." https://www.energy.gov/oe/building-better-grid-initiative
[2] DOE Office of Electricity. "Voices of Experience." https://www.smartgrid.gov/voices_of_experience

Discussion

Bob Cummings said there needs to be a sea change in how the grid is analyzed and understood because the grid presents as a huge controls problem. Inverter-based resources (IBR) especially are introducing new levels of complexity and are not as well understood as rotating generation sources.

Tom Bialek lauded the Grid Modernization Laboratory Consortium.[3] He said it is important to take a step back and understand that the grid is fundamentally changing. For example, increased use of IBR changes the levels of fault current.

Lisa Frantzis said regulators need more information and need to be equally involved in the process. She encouraged DOE to engage regulators as stakeholders.

Questions and Answers

Q1. Kimberly Denbow commented that the industry has made major improvements since the first EAC meeting in 2008, but ineffective policies continue to be put in place.

PDAS Bindewald agreed that the issues cannot be solved through technological changes alone, but also require changes to markets and policies. He noted that regulatory processes are evolving based on lessons learned.

Q2. Michael Heyeck noted that spending on transmission has increased significantly and that the electric power sector has reduced emissions considerably and more quickly than other sectors. Synchrophasors have increased visibility on the grid, and next-generation energy management systems are more prevalent. On the other hand, the grid is becoming more of a just-in-time system. A major challenge he sees is for the electricity sector to enter into and help grow other sectors like electrified transportation.

PDAS Bindewald said the grid and its associated industries should set an example for the sectors with which they interact.

Q3. Lola Infante asked how the industry can become more proactive about addressing problems faced by the grid.

PDAS Bindewald said as the grid is better understood and modeled, it will enable better planning and more proactive approaches.

Q4. Jay Morrison said some of the entities that most need the resilience funding associated with the BIL do not know how to access it or how best to use it. He asked how these smaller entities

[3] DOE. "Grid Modernization Laboratory Consortium." https://www.energy.gov/gmi/grid-modernization-lab-consortium

can be helped so they don't fall behind when larger entities (e.g., large utilities) access BIL funding.

PDAS Bindewald said there is funding set aside for small utilities. He encouraged EAC input on current DOE requests for information.

Bipartisan Infrastructure Law Implementation

US Richmond said the $62 billion associated with BIL is the largest investment in DOE since its founding. Congress delivered a mandate to fight the climate crisis, go big on clean energy, and modernize infrastructure. She referenced the recent DOE reorganization to support implementation of the BIL, creating a new Under Secretary for Infrastructure. US Richmond said her office will work closely with the Under Secretary of Infrastructure to bring innovative technologies from the research and development stage to commercial deployment. US Richmond discussed DOE's Earthshots.[4]

Discussion

Ms. Frantzis echoed Mr. Morrison's comment above that small entities such as cities and towns do not have the staff, experience, or expertise to access the energy efficiency money associated with the BIL. She encouraged US Richmond and DOE to dedicate attention to this issue and also urged DOE facilitation of and coordination with regional hydrogen hubs.

Mr. Heyeck said U.S. policies need to be better geared toward supporting electrification of bicycles and scooters (in addition to electrification of other vehicles as he witnessed in Zurich recently).

Questions and Answers

Q1. Lynne Kiesling asked what role US Richmond thinks various fields of economic analysis play in the applied science and deployment phase of bringing new technologies to market. She asked how behavioral social science can lend insight into the choices energy users make. Second, she asked how market design and regulatory design should co-evolve with evolving grid technologies. Third, she referenced industrial organization and future utility business models.

US Richmond said that kind of economic analysis is important to take into account. She referenced a potential partnership with the National Science Foundation on such work as well as work being done through the national laboratories.

PDAS Bindewald said social and behavioral science will be helpful in relation to microgrids and energy justice. Better predictions about how price signals affect behaviors at the grid edge and how that contributes to system reliability and resilience is an area of growing research in DOE's portfolio.

[4] DOE. "Energy Earthshots Initiative." https://www.energy.gov/policy/energy-earthshots-initiative

Q2. Clay Koplin asked for US Richmond's takeaways from the recent Electrify Alaska conference.

US Richmond said the state is a great laboratory for trying innovative technologies and practices. She said people in the state are adapting quickly as the climate and environment changes relatively quickly.

Q3. Ms. Reder asked US Richmond to discuss DOE's workforce development priorities.

US Richmond said DOE is working more closely with two-year and four-year technical and community colleges, as well as working with underrepresented institutions, to connect students with internship and job opportunities at the national laboratories.

Panel: National Transmission Planning Study (NTPS) Presentation

Panelists

- Carl Mas, Senior Advisor, Electricity Delivery Division, Office of Electricity, U.S. Department of Energy
- Hamody Hindi, Transmission Planning Engineer, Electricity Delivery Division, Office of Electricity, U.S. Department of Energy

Panelist remarks and presentation slides can be found online at the link provided in the Meeting Overview section above.

Discussion

Andrew Barbeau said the National Transmission Planning Study and the recent Federal Energy Regulatory Commission (FERC) Notice of Proposed Rulemaking (NOPR) are welcome efforts because transmission planning has been too incremental and too slow. He said getting the right inputs is critical and suggested having state commissions conduct studies to then use as inputs. A feedback loop could then be created between the national-level study and state-level studies.

Mr. Mas replied that DOE is seeking state engagement on inputs for the NTPS. He noted that resources are key since not all states can afford to engage with DOE's long-term studies and said that OE's budget for next year directs additional funding to technical assistance for states.

Mr. Cummings commented that the NTPS does not account for generation retirements. He further commented that increased electric vehicle charging will create huge load demand, which alters the behaviors and needs of the grid. He added that if direct connection interties are too large, they can change the operating reserve requirements in the entire interconnection area.

Mr. Mas replied that DOE's capacity expansion model is also a capacity retirement model, which will take into account generation retirements. Mr. Cummings noted that the location of the generation loss is an important factor.

Lauren Azar urged that FERC Order 890 planning authorities be actively involved in the NTPS process and that a full suite of benefit metrics be created for industry to rely on. Without those benefit metrics, transmission will not get built because there will be no way to prove that the benefits outweigh the costs. Ms. Azar said several studies have shown that a national approach to building out transmission will be the most effective and affordable for consumers.

Jennifer Chen encouraged DOE to bring its transmission plans to regional planning processes.

Mr. Mas replied that DOE has organized its technical review committee (TRC) structure geographically around FERC Order 1000 regions. Representatives from each region are on the committee.

Chris Ayers said maps of renewable energy zones would be very valuable to his organization. In North Carolina, they are trying to navigate a carbon reduction standard and such maps would facilitate cost-effective planning. He added that technical assistance briefings to the regulatory community will be important.

Daniel Brooks said DOE's studies need to consider the interplay between the electric sector and other end use sectors, as well as fuel supply models for low-emission resources that will be needed to fully decarbonize difficult-to-electrify end uses.

Mario Hurtado said the process DOE is going through is as valuable as the outcome and he commended DOE on its collaboration with regional planning authorities and other stakeholders.

Questions and Answers

Q1. Mr. Barbeau asked if variations would be examined within macrogrids.

Mr. Mas said the NTPS will examine seven or eight transmission grid variations, which will afford the opportunity to look at multiple versions of high-voltage direct current transmission expansion.

Q2. Mr. Ayers asked how the NTPS is influenced and impacted by the recent FERC NOPR and the Section 209 FERC/National Association of Regulatory Utility Commissioners joint proceeding.

Mr. Mas said FERC and DOE do influence each other, and there are interactions both at the staff level and formally through the comment process.

Q3. Ms. Chen referenced Argonne National Laboratories Energy Zones Mapping Tool, which included siting risks, and asked how the NTPS is factoring in siting risks.

Mr. Mas said DOE has done outreach to all the national labs that have done relevant work and that some siting challenges are already incorporated in the NREL modeling tools.

Q4. Ms. Chen asked if DOE's modeling gets to the granularity of modeling specific technologies to show the associated energy efficiency gains (e.g., line loss reductions).

Mr. Mas said nodal analysis associated with production cost and power flow modeling will allow for this level of granularity.

Q5. Sheri Givens asked how hydrogen will be incorporated and modeled in the study.

Mr. Mas said it will mostly be an exogenous set of assumptions that looks at fuel price scenarios. As part of the project the national labs are exploring ways to model hydrogen infrastructure expansion but they will not be doing detailed hydrogen economy analysis.

Q6. Dr. Bialek asked if DOE modeling is using an 8760 approach (i.e., modeling demand every hour of the year).

Mr. Mas said all production cost modeling will be 8760.

Panel: DOE Authorities for Transmission Deployment

Moderator

- Lauren Azar, Founder, Azar Law LLC

Panelists

- Michelle Manary, Acting Deputy Assistant Secretary, Electricity Delivery Division, Office of Electricity, U.S. Department of Energy
- Sam Walsh, General Counsel, U.S. Department of Energy
- Tracey LeBeau, Administrator, Western Area Power Administration
- Michael Skelly, Chief Executive Officer, Grid United
- Jeff Cook, Vice President of Transmission Planning and Asset Management, Bonneville Power Administration

Panelist remarks can be found online at the link provided in the Meeting Overview section above.

Discussion

Dr. Bialek said DOE needs to focus on information sharing and education for the public and consumers so they better understand the need for transmission projects. Otherwise, the projects usually face public resistance. He further noted that the timeline for these projects, from planning studies to operational transmission lines, can be several decades long and said something needs to be done to accelerate the process.

Tom Weaver said there is not just public opposition to siting transmission lines, but also to siting of solar and wind generation.

Michael Heyeck said distribution needs to be addressed at the national level. He commended use of the Competitive Renewable Energy Zones (CREZ) model for transmission planning (e.g., the Texas model). He also noted that load factor in the U.S. today is around 50%. The country is not using the capacity it has, and time-of-use will not suffice.

Mr. Mas said the NTPS will explicitly cite the CREZ model.

Ms. Chen suggested that the NTPS results could be structured to show that without interconnection-wide or nationwide planning just and reasonable rates cannot be attained.

In terms of stakeholder engagement, Ms. Chen suggested partnering with states that have explicit renewables goals to help them with modeling.

Mr. Koplin said the different structures for siting authorities that have been attempted over the years could be informative for Alaska, which has a unique regulatory situation in relation to FERC and the North American Electric Reliability Corporation.

Mr. Morrison asked that DOE stakeholder engagement include municipal utilities, cooperatives, and other organizations that don't have a financial stake in building transmission but who will pay the cost as wholesale transmission customers.

Brian Lipscomb noted the general public opposition to building large transmission projects. He said there are real issues of pending failure in the transmission system. In the west, wildfires will continue to threaten transmission lines.

Ms. Azar said exercising federal eminent domain takes courage and is often key for completing transmission projects.

Mr. Lipscomb added that supporting studies that show the negative consequences of not exercising eminent domain can help facilitate exercising the power.

Mr. Heyeck said transmission planning will also need to take into account the nation's generation portfolio, which will include not just renewables and natural gas but also small modular nuclear reactors and hydrogen.

Questions and Answers

Q1. Mr. Morrison asked how national transmission corridors figure in to DOE's current planning.

Mr. Mas said there is a separate study and workstream that addresses national transmission corridors. The study was formerly called the transmission congestion study but is now branded as DOE's transmission needs study.

Adria Brooks said DOE is analyzing publicly available data to determine where the need for new transmission is greatest. Previous congestion studies only focused on current and historic needs. The BIL now directs DOE to determine future needs. DOE is obligated to produce a national transmission needs study every three years.

Q2. Dr. Infante asked if there are any alternatives to transmission that can be deployed on the necessary scale in the necessary timeframe to meet DOE, BIL, and administration goals.

Mr. Mas said DOE is examining all possible solutions to jointly optimize generation, transmission, and storage. Those include non-wires alternatives, as well as grid enhancing technologies.

Ms. Azar said an all-of-the-above strategy is needed.

Mr. Skelly added that there is no alternative to building out the grid.

Q3. Mr. Brooks asked if there is a forum or vehicle for stakeholder input into what transmission benefit metrics will be.

Ms. Azar said the NTPS will be examining benefit metrics. She noted that there is quite a bit of expertise required to develop the metrics.

Mr. Mas added that DOE's TRC is intended to pull in a broad array of expertise. DOE will also be holding open public forums.

Q4. Ms. Denbow asked where natural gas figures into DOE's planning. She noted that natural gas can play an important role in resilience.

Mr. Mas thanked Ms. Denbow for her comment and said the NTPS models different scenarios of grid evolution over different timelines, and natural gas plays a role in those scenarios.

Q5. Ms. Frantzis asked if NTPS scenarios take into account work being done on dynamic line rating and other approaches to improving the capacity of the transmission system.

Mr. Mas said the NTPS's more granular nodal analysis will examine non-wires options.

Q6. Mr. Barbeau asked if any NTPS scenario examines constrained siting. He added that much local opposition to transmission and use of eminent domain is oriented around the 90-day timeline.

Mr. Mas said that is still a work in progress and there will not be a single driver for constraints. DOE will work with its stakeholder group to identify siting constraint variables to include.

Q7. Mr. Fellon asked if NTPS modeling looks at other countries, such as Germany, and the challenges they have had.

Mr. Mas said DOE is looking to Europe for both positive and negative examples, including how Europe organizes its grid and grid planning across the region.

Q8. Ms. Chen referenced Native American tribes becoming joint owners of transmission lines. She asked if arrangements like that could be considered for other communities to help those communities have a sense of shared investment in the development projects.

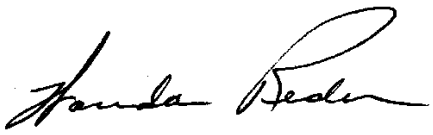
Mr. Mas said these types of arrangements could be qualitatively discussed as part of the NTPS.

Concluding Remarks

Ms. Reder thanked everyone for their contributions and noted the start time for day two of the EAC meeting. Mr. Lawrence adjourned the meeting for the day.

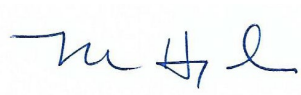
Signature Page

Respectfully Submitted and Certified as Accurate,



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

10/12/2022
Date



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

10/12/2022
Date

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

10/12/2022
Date