U.S. Department of Energy
Electricity Advisory Committee Meeting

National Rural Electric Cooperative Association Conference Center

Arlington, Virginia

October 27, 2022

Day 2 Meeting Summary

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Day 2 Participants

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Meeting Overview

The Electricity Advisory Committee's (EAC) third and final meeting of 2022 was held October 26 and 27 using a hybrid format at the National Rural Electric Cooperative Association building in Arlington, Virginia, with the option of virtual participation via the video conferencing platform Webex. On the second day of the meeting, Laura Martin, Operations Research Analyst at the U.S. Department of Energy's (DOE) Energy Information Administration (EIA), provided a presentation on EIA's 2022 Annual Energy Outlook. Dr. Tom Bialek, EAC member and Chief Technology Officer at Toumetis, moderated a panel titled "Improving Planning Processes for Electric Vehicle (EV) Infrastructure Deployment." The panel featured speakers from the University of California, Davis, the Joint Office of Energy and Transportation, and San Diego Gas & Electric. A moderated roundtable discussion between the EAC members and panelists followed the panel presentations. To conclude the day, the Smart Grid Subcommittee Chair and Vice Chair, Dr. Bialek and Darlene Phillips, respectively, provided updates on subcommittee activities and work products. The EAC voted unanimously to approve the Section 8008 Voluntary Model Pathways recommendations.

All presentations, as well as recordings of the meeting, can be found at https://www.energy.gov/oe/october-26-27-2022-electricity-advisory-committee-meeting.

Opening Remarks

Jayne Faith, EAC Designated Federal Officer, welcomed attendees, covered several housekeeping items, took attendance, and officially called the meeting to order. EAC Chair Wanda Reder outlined the agenda and introduced the first speaker.

Energy Information Administration (EIA) 2022 Outlook

Laura Martin presented EIA's 2022 Annual Energy Outlook (AEO). Her remarks and presentation slides can be found online via the link provided in the Meeting Overview section above.

Discussion

Bob Cummings noted that wind generation is being curtailed in the Upper Midwest because additional transmission was not built to support the additional wind generation.

Kimberly Denbow noted that natural gas production is at record levels and liquefied natural gas (LNG) exports are at their maximum. The natural gas industry faces the same transmission constraints as the electricity sector.

Questions and Answers

Q1. Michael Heyeck asked whether AEO takes into consideration scenarios where other sectors begin to rely more heavily on the electric sector.

Ms. Martin said AEO does not contain cases that force that to happen. She discussed the slide that presents a scenario with a carbon fee.

Q2. Mr. Heyeck said that, on the supply side, there does not seem to be much shown for hydrogen and small modular reactors in 2050.

Ms. Martin said they model small modular reactors and the high carbon fee scenario shows a moderate increase in nuclear capacity. Hydrogen is not included in the model yet.

Q3. Tom Weaver asked how the AEO projects compare with federal and state emissions reduction goals.

Ms. Martin said they do not model any requirements for emissions levels.

Q4. Mr. Weaver asked for confirmation that the slide on U.S. electricity generation reference cases by region showed PJM Interconnection with nearly 75% generation derived from coal, nuclear, and natural gas in 2050.

Ms. Martin provided confirmation.

Q5. Daniel Brooks said the projections for electrification look lower than many of the models he has seen that incorporate the Inflation Reduction Act provisions and emissions reductions goals. He asked about electricity's share of end-use energy in 2050.

Ms. Martin said she does not have that number available.

Q6. Mr. Brooks asked whether carbon capture or other negative emissions technologies are modeled.

Ms. Martin said carbon capture technologies are included in the model and account for a few gigawatts here and there. Their sequestration option does not play a major role in the model.

Q7. Mr. Brooks asked whether the model is projecting buildout of interregional transmission, and if so, what kind of increases in interregional transmission capacity are there to support high-renewable cases.

Ms. Martin said the model can build new transmission lines among the 25 regions and that higher renewable cases build more.

Q8. Representative Don Parsons asked whether domestic oil and/or gas production has reached the levels found prior to the COVID-19 pandemic.

Ms. Martin did not have that exact information in her slides.

Q9. Drew Fellon asked why residential and commercial electricity demand is rising more significantly than industrial demand through 2050.

Ms. Martin said there are separate models for residential, commercial, and industrial electricity demand. Each has different drivers and she is not familiar with the details about why the different sectors vary.

Q10. Mario Hurtado asked about the base assumption for growth of the electric grid and how supporting infrastructure is added to support generation.

Ms. Martin said they do not model the grid per se. They assume within each region that power can flow where it needs to go. In terms of transmission expansion, they assume that investment continues along historic lines.

Q11. Mr. Hurtado asked what role LNG exports play in the model.

Ms. Martin said she is not familiar with that area of EIA's work. They do project additions to LNG facilities.

Q12. Lisa Frantzis asked when EIA will incorporate recent developments (the Bipartisan Infrastructure Law, Inflation Reduction Act, and the Russian invasion of Ukraine) into its models.

Ms. Martin said they have already started making adjustments; however, they do not release updates out of cycle. The release date for AEO 2023 is early March 2023.

Improving Planning Processes for Electric Vehicle (EV) Infrastructure Development

Moderator

- Dr. Tom Bialek, Chief Technology Officer, Toumetis

Panelists

- Dr. David Rapson, Professor, University of California, Davis, and Policy Advisor and Senior Economist, Federal Reserve Bank of Dallas
- Alex Schroeder, Chief Technology Officer, Joint Office of Energy and Transportation
- Alan Dulgeroff, Director of Electric System Planning, San Diego Gas & Electric (SDG&E)

Moderator and panelist remarks and presentation slides can be found online via the link provided in the Meeting Overview section above.

Discussion

Dr. Lynne Kiesling emphasized Dr. Rapson's comment that regulations shrouding price discovery are a considerable distortion in the electric system. She added that the drive for universal electrification potentially forecloses on alternative pathways to achieving the desired outcome of decarbonization by focusing too much on one particular technological approach.

Nicole Lowen pointed to the political obstacles to passing a price on carbon dioxide emissions.

Dr. Rapson noted several important considerations for decarbonization. First, there is no incentive to drive gasoline cars less until it becomes more expensive to do so. He noted that the American Petroleum Institute supported a federal carbon tax because it would provide regulatory certainty, although they conditioned their support on the removal of subsidies contained in the Inflation Reduction Act.

Questions and Answers

Q1. Andrew Barbeau asked about at-work EV charging and the Joint Office's related plans.

Mr. Schroeder said destination charging as it is described in his presentation slides and workplace charging are the same.

Q2. Jessica Matthews asked what pushback the Joint Office expects to receive at the municipal and state levels to its efforts at standardization.

Mr. Schroeder said they are currently in open rulemaking and so he cannot comment on specifics. They received 383 comments regarding the standards.

Q3. Clay Koplin asked whether the move to EVs is being driven by market forces or by policy and financial incentives.

Dr. Rapson said EV sales are being driven by policy and incentives, and that such policies and incentives were necessary to overcome certain hurdles. On the point of technology neutrality, he noted that, for decades, economists have advocated for taxes on pollution (e.g., a price on carbon dioxide emissions) rather than incentives for particular technologies.

Q4. Dr. Jennifer Chen asked about how best to leverage the demand-side resource of EVs and how to transfer the price incentives faced by drivers of internal combustion engines over to EV drivers as well.

Dr. Rapson said there are two key tasks that need to be accomplished with regard to rate design. First, move away from recovering fixed costs through variable charges. Second, the time-varying and location-specific nature of the electricity market creates time- and location-varying pricing

that is too complex for consumers to understand. There needs to be automation or centralized control at utilities so that they can make decisions on behalf of consumers about when EVs are charged.

Q5. Dr. Chen also asked whether EV charging station siting leverages the location flexibility associated with EV charging behaviors.

Mr. Dulgeroff said SDG&E has heat maps showing load hosting capacity.

Q6. Rep. Don Parsons asked whether the transition to EVs poses a national security threat due to supply chain risks.

Mr. Schroeder noted the large amount of activity underway develop domestic production.

Q7. Nicole Lowen asked whether recent legislation provides funding for the make-ready work associated with EV charging stations. She added that she hopes the Joint Office is addressing micromobility and public transit.

Mr. Schroeder acknowledged the legislative limitations to the funding they can provide may involve make-ready work. He acknowledged that there is a need for innovation with charging at multifamily and hotel sites. Mr. Schroeder agreed that there are more mobility solutions needed than EVs, and he sees great value in the Joint Office, which brings together DOE and the U.S. Department of Transportation.

Smart Grid Subcommittee Update

Darlene Phillips, Subcommittee Vice Chair, discussed the updates made to the Section 8008 Voluntary Model Pathways recommendations. The work product passed unanimously. Dr. Bialek, Subcommittee Chair, overviewed potential future panel topics.

Public Comments

No public comments were submitted.

Concluding Remarks

Mr. Koplin recommended the agile project management methodology to improve the efficiency with which organizations undertake the energy transition.

Rick Mroz noted that EV charging station standards are still under development and currently there is no established, universal standard. That includes cybersecurity standards.

Lauren Azar said the changes required to build the 21st century grid will reach far beyond incremental changes to the 20th century grid. She added that jurisdictional ambiguities are a significant hindrance. She suggested developing recommendations for DOE to take to Congress that address the lack of clearly defined roles for 21st century grid modernization.

Jay Morrison said each challenge associated with the energy transition should have a status report that indicates overall progress. Such a report should also show the amount of funding and investments both already dedicated and required.

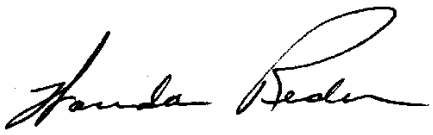
Acting Principal Deputy Assistant Secretary Gil Bindewald read a quote from former EAC member Bob Thomas:

> "The US electric system must plan for and then execute the economical, reliable, and environmentally clean operation of an already very complex system. This system is in transition to an even more complex environment where a communication system is being woven into the fabric of electric supply, delivery and demand through the creation of the smart grid. This transition together with the already complex nature of the system requires that we create a better fundamental understanding of the nature of this complex system than we currently have.
>
> In the old world the structure of the industry required constantly building new generation and transmission in order to make a profit. There were no CO2 environmental constraints, and all generation was dispatchable. Today, there is a substantial paradigm shift taking place. The introduction of non-dispatchable generation, the disaggregation of the vertically integrated system and an inability to easily site transmission are creating a substantially more uncertain world. Reliability margins are disappearing and will not be reinforced with the introduction of new equipment.
>
> If we are to improve the capacity factor, we will have to operate closed to stability boundaries than ever before. This means we will have to rely on real-time measurements and better modeling and simulation tools. We can no longer afford to guess at the margins, nor to build the equipment redundancies needed to cover the uncertainty created by our inability to run models that are large and/or complex enough."

Ms. Reder thanked everyone for their contributions and provided closing comments. Ms. Faith adjourned the meeting.

Signature Page

Respectfully Submitted and Certified as Accurate,



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Chair
DOE Electricity Advisory Committee

2/9/2023
Date

Michael Heyeck
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2/1/2023
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Designated Federal Officer
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Date