



**U.S. Department of Energy
Electricity Advisory Committee Meeting
Hosted Virtually via Webex
March 9, 2022**

Meeting Summary

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Meeting Overview

The EAC's first meeting of 2022 on March 9 and 10 was held virtually via the video conferencing platform Webex. On the first day of the meeting Patricia Hoffman, Acting Assistant Secretary (AS) for the U.S. Department of Energy (DOE) Office of Electricity (OE), provided an update on OE programs and initiatives, particularly as they relate to implementing the Bipartisan Infrastructure Law (BIL) and achieving the clean energy goals of the current administration. Commissioner Allison Clements of the Federal Energy Regulatory Commission (FERC) provided an update on FERC activities, particularly as they relate to transmission system planning and black start capabilities.

The EAC held two panels on the first day of the meeting. The first, titled "Facilitating the Integration and Commercialization of Energy Storage: How DOE Can Leverage its Role and Resources," included presentations from McKinsey & Company, Hawaiian Electric Company, Eversource Energy, Luminant Energy, and ESS Inc. The second panel, titled "Data Interoperability for a Smooth Transition of EV Deployment," included presentations from EVgo, Amazon, National Grid, and the City of Poughkeepsie. 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/march-9-10-2022-meeting-electricity-advisory-committee>.

Welcome, Introductions, and Developments Since Last Meeting

Matthew Aronoff, EAC Acting 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 AS Hoffman to provide an update on OE's programs and initiatives.

Update on Office of Electricity Programs and Initiatives

AS Hoffman thanked the EAC for the continuing service it provides to DOE and emphasized the importance of EAC insights as DOE implements the BIL. She also thanked FERC for its participation in the EAC meeting, saying the EAC should consider itself an advisory committee for the whole of government and that interagency collaboration will be required to achieve the goals of the administration and create the grid of the future.

AS Hoffman said her approach to OE priorities and investments is largely driven by the need to improve grid resilience and to address the changes needed to achieve the administration's clean energy goals. With the influx of BIL funding, she is also focused on the research, development, demonstration, and deployment of critical technologies. She referenced the history of successes associated with the American Recovery and Reinvestment Act of 2009, in particular DOE investments in phasor measurement units, smart meters, and intelligent fault interrupters that advanced the capacity and capabilities of the electric utility industry.

The Building a Better Grid Initiative was announced by the Secretary of Energy in January 2022 to catalyze the nationwide development of new and upgraded high-capacity electric transmission lines. AS Hoffman said additional transmission capacity will be key to achieving improved grid resilience and achieving the clean energy goals of the administration. OE wants to create a partnership with independent system operators (ISOs), regional transmission organizations, and other transmission planners to think about priority transmission projects and how to optimize development of the transmission system.

AS Hoffman discussed several provisions of the BIL that allocate billions of dollars for financing transmission projects, resilience investments, and energy storage. She also referenced the large amount of financing made available by the BIL for investment in electric vehicles (EVs) that a partnership between DOE and the Department of Transportation (DOT) is directing.

The recent DOE reorganization will bring a portion of the Office of Electricity into the new Grid Deployment Office (GDO) organized under the Office of the Under Secretary for Infrastructure. The Office of the Under Secretary for Science and Innovation (S4) will work on science partnerships to foster next-generation technology. AS Hoffman said the GDO is interested in close collaboration with S4 on technology development and invited the EAC to provide any suggestions it has for how to foster that collaboration. Modeling, power electronics, and advanced materials are promising areas for collaboration. AS Hoffman is also focused on supply chain issues and their connection to next-generation technology.

Discussion

Questions and Answers

Q1. Kimberly Denbow thanked AS Hoffman for her remarks and asked about the apparent lack of emphasis on natural gas and its role in resilience and energy storage. She noted the importance of natural gas as a backup generation source to renewables.

AS Hoffman replied that flexible fuels like natural gas play a role and that DOE is trying to transition to cleaner versions of those fuels.

Q2. Sharon Allan asked if S4's work on next-generation technology will be in collaboration with the Advanced Research Projects Agency–Energy (ARPA-E).

AS Hoffman said the level of collaboration is to be determined, but that she foresees ARPA-E remaining focused on early-stage technologies.

Q3. Delia Patterson asked if DOE has the authority it needs in relation to permitting and siting to achieve the goals AS Hoffman described in the proposed timelines.

AS Hoffman said she has not yet had an opportunity to think about where the potential gaps are in DOE's authorities. She acknowledged that constraints exist but is optimistic that a lot can be accomplished under existing authorities.

Q4. Paul Stockton asked AS Hoffman to provide her thoughts on resilience and preparedness in the context of increased cybersecurity concerns related to recent geopolitical events.

AS Hoffman said recent geopolitical events are a reminder to remain vigilant about cybersecurity. She said DOE has been in a heightened state of alert and has been communicating and collaborating with industry. She noted that the BIL has cybersecurity provisions.

Q5. Lisa Frantzis asked if DOE’s partnership with DOT will address business model issues and the allocation of costs associated with EV infrastructure.

AS Hoffman strongly encouraged the EAC to provide input to make sure DOE does not miss important considerations like the business model and rate design concerns related to EV infrastructure.

Q6. Brian Lipscomb asked whether BIL transmission funding will be made available to Native American tribes.

AS Hoffman said BIL Section 40101, “Preventing outages and enhancing the resilience of the electric grid,” provides for formula grants that are distributed to states, territories, and tribes. She said the formula for the grants has five criteria and is still under development. She said a Notice of Intent will be issued that solicits input.

Q7. Jennifer Chen asked about DOE’s plans to encourage optimal use of existing infrastructure.

AS Hoffman supported the idea of optimizing use of existing infrastructure. She said she does not have details on hand about DOE’s plans in that area.

Update on FERC Activities

Commissioner Allison Clements thanked the EAC for the opportunity to speak and issued the disclaimer that her comments do not represent the official position of FERC. She referenced several orders issued by FERC related to transmission system planning. Commissioner Clements said a successful transmission planning rule should find the right balance between prescription and flexibility, allow regions to engage in robust scenario-based transmission system planning, allow prudent and strategic cost allocation, and relieve pressure on the interconnection queue. She noted that many issues, such as regional market design and capacity market design, have become adversarial and litigious. FERC has convened states and other stakeholders, separate from the rulemaking process, to try to work through those contentious issues.

Commissioner Clements referenced black start, saying FERC has a role via the reliability standards it approves. FERC has worked with the North American Electric Reliability Corporation to assess where funding for black start resources and capabilities could come from.

Commissioner Clements said she believes climate change is one of the defining challenges of our time. While FERC does not have the authority to regulate greenhouse gases, it should take

climate change into consideration when considering system reliability and resilience. Commissioner Clements stated that equity is an important consideration for regulators charged with serving in the public interest.

Discussion

Bob Cummings commented on the need to connect the Eastern and Western Interconnections and to ensure that the technology that ties them together has sufficient capabilities to ensure adequacy and reliability.

Tom Bialek commented on the need for regulatory certainty.

Commissioner Clements said she sees the need for regulatory certainty and noted that incremental changes are called for in some cases while systemic overhaul is called for in other cases.

Questions and Answers

Q1. Andrew Barbeau asked about the timelines associated with transmission planning and the need to transition from retrospective to forward-looking transmission planning. He asked what FERC's role in facilitating that transition is, especially in the context of a continually changing energy landscape (e.g., generator facility closures, state energy policies).

Commissioner Clements said planning always takes place in a climate of uncertainty and that she strives for accurate scenario planning that uses the best data available to determine no-regrets or least-regrets investments.

Q2. Darlene Phillips asked if FERC has considered convening a state task force to tackle equitable allocation of costs associated with the generation of greenhouse gas emissions.

Commissioner Clements said FERC has done work in that area. She referenced the "beneficiary pays principle," which stipulates that recipients should pay for investments they benefit from. Separating out benefits that occur in multistate markets is challenging, and residents of one state should not be made to pay for another state's policies. The key is to plan the system more efficiently and in a way that takes all inputs into consideration.

Q3. Flora Flygt asked if FERC is familiar with the Midcontinent Independent System Operator's multivalued planning approach and whether it could promote similarly holistic transmission planning in other jurisdictions.

Commissioner Clements affirmed the need for holistic transmission planning and said a challenge is to conduct that robust planning without saddling customers with unnecessary costs.

Panel: Facilitating the Integration and Commercialization of Energy Storage: How DOE Can Leverage Its Role and Resources

Moderators

- Lisa Frantzis, Partner in Energy, Sustainability, and Infrastructure, Guidehouse
- Ramya Swaminathan, CEO, Malta, Inc.

Panelists

- Godart van Gendt, Senior Expert, Sustainability and Electric Power & Natural Gas Practices, McKinsey & Company
- Yoh Kawanami, Director, Hawaiian Electric
- Matt Ballew, Long Term Service Agreement Manager and Technology Strategist, Luminant Energy
- Eric Dresselhuys, CEO, ESS, Inc.
- Roger Kranenburg, VP of Energy Strategy and Policy, Eversource

Lisa Frantzis provided brief introductory remarks and cited several statistics from Guidehouse Insights to add context for the panel conversation. Ramya Swaminathan introduced the panelists.

Godart van Gendt discussed the Long Duration Energy Storage (LDES) Council, a CEO-led organization that provides guidance to governments, grid operators, and major electricity users on the deployment of long-duration energy storage. LDES Council released its inaugural report in 2021 in advance of the United Nations' 26th Conference of the Parties. The report found that LDES will play a major role in net-zero power systems, and that cost performance is expected to improve sharply (a 60% cost reduction by 2040).

Yoh Kawanami presented on customer-sited and large-scale battery storage on the Hawaiian Electric utility system. The utility recently implemented an incentive program to encourage residential and commercial customers on the island of O'ahu to add a battery energy storage system (BESS) to an existing or new rooftop solar photovoltaic (PV) system. The utility's new initiatives include advanced inverter standards development and DOE-funded work on grid-forming inverter technology in consultation with national labs.

Matt Ballew said Luminant currently has 1,200 megawatts (MW) of energy storage on its system, all of which is lithium-ion batteries. Currently, they are not receiving a market signal for long-term energy storage. However, he noted that the need for long-term storage exists despite the current lack of a market signal. Current market signals are not capturing the needs of not-yet-existing future markets that will rely on technologies that are still immature or have not yet been developed.

Eric Dresselhuys said LDES addresses the challenges related to intermittency and curtailment posed by increasing penetration of renewable energy resources. LDES offers many capabilities, including those related to bulk shifting, grid resiliency, congestion management, localized capacity management, and microgrids. The U.S. is positioned to lead globally in terms of domestic manufacturing of LDES.

Roger Kranenburg said Eversource has a vibrant behind-the-meter (BTM) storage program called ConnectedSolutions. Eversource acts as a network operator, interfacing with BTM batteries and dispatching as needed. Mr. Kranenburg referenced the BESS and microgrid maintained by Eversource in Provincetown, Massachusetts, which has greatly improved the reliability and resilience of the town's electric grid.

Discussion

Questions and Answers

Q1. Lisa Frantzis asked the panelists what the common challenges are to energy storage deployment, and what DOE can do to improve storage adoption and deployment.

Mr. Ballew said some technologies are hard to scale. In other cases, there are geographic constraints. For new technologies, it can be challenging to ensure there are proper training programs to equip personnel with the knowledge and skills to conduct operations and maintenance. Mr. Ballew said the techno-economic studies conducted by DOE are a big help and allow his company to get a sense of the readiness level of various technologies, as well as how to integrate long-term business viability challenges. He also sees a bigger need for modeling and commended AS Hoffman's attention to that.

Mr. Dresselhuys echoed Mr. Ballew, saying that modeling, economic incentives, and proper training to deal with new technologies are key issues. He encouraged DOE to continue its focus on modeling and develop templates that can be used by the states. He further encouraged DOE to move quickly to implement the BIL and allocate the funding dedicated to demonstration projects and bolstering domestic manufacturing capacity.

Mr. van Gendt encouraged a focus on creating a business case for the positive externalities associated with energy storage that are not currently monetizable by market players. According to the LDES Council, over half of the value of energy storage lies in the improved utilization it facilitates for fixed transmission and distribution infrastructure. He referenced transmission credits, which allow for the monetization of transmission value by installing storage and address CO₂ externalities.

Q2. Mario Hurtado asked Mr. Dresselhuys to address the statement in his slide deck that it is hard to maintain renewable penetration system reliability above 20% to 25% without LDES.

Mr. Dresselhuys said that has been his observation as a vendor in the market.

Q3. Ms. Denbow asked about alternatives to lithium-ion batteries.

Mr. Dresselhuys said his company builds iron-air batteries, and that gravity-based, compressed air, and heat-based systems also exist. ESS's iron-air batteries are made from iron, salt, and water. This offers several advantages: the supply chain is secure because the batteries do not use rare-earth minerals, the batteries' capacity does not diminish over time, and the systems are not flammable in the way lithium-ion systems are.

Q4. Lynne Kiesling referenced a graph on slide seven of Mr. van Gendt's presentation, asking what data signals triggered the charging and discharging of New York ISO's (NYISO) LDES installations. More generally, she asked how to think creatively about promoting market design and institutional frameworks associated with LDES that create the most value.

Mr. van Gendt said the graph showing NYISO LDES charging and discharging was modeled on physical system need and running the system at lowest cost. There was virtually no price signal involved. Getting the lowest cost for the system as a whole will require choosing the right mix of assets. In regard to thinking creatively about market design and institutional frameworks, he referenced the example of electric vehicle credits in California that involve original equipment manufacturers of combustion engine vehicles transacting with electric vehicles. He asked if a credit market could be created where integrated utilities pay storage developers for the transmission value created by deploying storage.

Q5. Dr. Bialek referenced the levelized cost of electricity (LCOE) as it applies to energy storage and the need for planning at the hourly level year round (8760 planning) to better integrate storage. He asked panelists for their thoughts on the constraints associated with LCOE as it applies to energy storage and the need to transition to 8760 planning.

Mr. Kranenburg said Eversource thinks of storage as a grid resource and a tool in their toolbox. Referencing his Provincetown example, he said any benefits above the primary functionality of the battery flow back to customers.

Mr. Cummings referred to plans in New Mexico to replace retiring coal plants with 500 MW of solar PV and 200 MW of four-hour batteries, pointing out that it is not an adequate replacement.

Q6. Ms. Phillips said PJM is engaged in discussion about storage as a transmission asset and noted that the issues are complicated. She asked how industry producers can help sort out all the complicated issues.

Mr. Dresselhuys said he wants his company to contribute to addressing those complicated issues and noted that the many value streams and uses of LDES are what make it so valuable but also so complicated.

Q7. Jay Morrison asked for panelists' reaction to the barriers his company faces to energy storage installation in North Carolina. Duke Energy has aggressively challenged the ability of Electricities to use storage for demand management, filing to change the rate it charges for wholesale electric power so that if Electricities uses storage to flatten its load profile it would pay a significant penalty. If Electricities or its customers install substantial amounts of storage that operate during peak hours, not only do they not benefit, they actually pay a penalty.

Panelists offered no responses. Ms. Frantzis said it is an important issue for the EAC to think about going forward.

Q8. Nicole Lowen asked Dr. Kawanami to speak to Mr. Cummings' comment about inverter-based resources like solar PV plus storage replacing coal generation assets.

Dr. Kawanami said Hawaiian Electric uses 8760 planning, which requires sophisticated solar and wind forecasting. New, dispatchable renewable energy resources have brought benefits to the system.

Mr. Barbeau referenced transmission deferral with energy storage activities, noting that zones and subzones of the grid have import and export constraints. Some of the efforts associated with the Building a Better Grid Initiative are meant to address those import and export constraints. Some of the battery systems being discussed for addressing those constraints are doing an activity similar to arbitrage, but the arbitrage value is not sufficient to pay for the battery or even properly value it for the zonal transmission relief it is getting. To the question of what DOE can do, as it studies and promotes transmission expansion it will be important to keep in mind the value that can be provided by LDES.

Clay Koplin said an important element of energy storage is flexible demand. He commented that things like new manufacturing facilities could have flexible demand.

Q9. Mr. Hurtado asked what Hawaiian Electric's experience has been with virtual power plants and getting resources committed from aggregators on the distributed generation side.

Dr. Kawanami said Hawaiian Electric has a demand response management system, also known as a distributed energy resource (DER) system. This is also known as a virtual power plant. They have issued several requests for proposals seeking aggregators to utilize DER. Hawaiian Electric has seen approximately 30 MW of capacity reduction as a result of aggregators and virtual power plants, which is significant for their system. The onset of COVID-19 significantly slowed down the participation of aggregators providing grid services.

Q10. Wanda Reder asked Dr. Kawanami to further discuss the BESS incentive program his company provided for installing storage on BTM solar generation. She noted that DOE may be able to help create a roadmap for states to use to facilitate widespread, equitable utilization of BTM resources. Secondly, she noted the two-hour window for scheduled dispatch associated with the battery incentive program and asked if that window could change.

Dr. Kawanami said their decision to schedule dispatch during a two-hour window came from the fact that most BTM batteries on their system are two-hour batteries. The company may create a program that allows for a four-hour window. Regarding equity, he sees it as a challenge to create the right amount of incentive and balance customer and utility interests. Customers buy a BESS with an idea about how long their investment will take to repay itself, but utility incentive programs like Hawaiian Electric's alter that calculus because the customer's BESS is utilized differently when serving the grid's needs compared to solely the customer's needs. He sees an equity dimension in the fact that a customer's electricity bill should not increase when participating in Hawaiian Electric's incentive program, and ideally should decrease. He said DOE could help by creating an objective equation for DER valuation.

Dr. Kiesling said she understands Dr. Kawanami's desire for a consensus value of DER, but the economic reality is that value is variable and subjective (i.e., grounded in the preferences and opportunity costs of individual participants). At the system level, there can be estimates for the reliability, resilience, and grid services values of DER. Those are only estimates, however. The closest way to know the value of DER objectively is through the interactions of market participants to enable them to discover those values.

Q11. Mr. Cummings asked how many panelists are incorporating grid-forming inverters in their storage projects.

Dr. Kawanami said some of their more recent projects have included a grid-forming requirement.

Mr. Dresselhuys said grid-forming inverters are being incorporated into the large-scale projects they are involved in.

Mr. Kranenburg said their Provincetown battery is grid forming because it is islanded.

Q12. Ms. Allan asked if Hawaiian Electric has experience placing storage systems near EV fast-charging stations.

Dr. Kawanami said Hawaiian Electric has a transportation electrification roadmap that includes a goal for the utility to install 25 fast-charging stations. The next phase is to install solar PV and BESS next to the fast-charging stations.

Q13. Ms. Swaminathan asked panelists to comment on how stakeholders can best cooperate to achieve the vision of more penetration of LDES. She also asked for any best practices panelists had observed.

Mr. van Gendt said the LDES Council has been an excellent example of stakeholder collaboration. However, he noted that U.S. representation is missing on the utility and developer side of the council. He encouraged U.S. stakeholders to have a more international perspective.

Dr. Kawanami said explaining grid services to a customer is challenging. Step one should be educating customers and increasing their confidence around physical and cybersecurity safety. He sees a role for DOE to contribute strategies for increasing that confidence.

Mr. Ballew said reaching a mutual understanding between stakeholders is key.

Mr. Kranenburg said at-scale LDES demonstration projects are critical.

Mr. Dresselhuys noted that DOE has significant funding available for LDES demonstration projects. He said DOE should use its available funding for encouraging domestic supply chains. In terms of international perspective, he noted the positive precedent being set by Singapore in its efforts to reach a 100% decarbonized grid.

Panel: Data Interoperability for a Smooth Transition of EV Deployment

Moderator

- Chris Irwin, Program Manager for Transactive Energy, Communications and Interoperability in Smart Grid, DOE Office of Electricity

Panelists

- Ivo Steklac, Chief Technology Officer, EVgo
- Nate Hill, Head of Energy Policy for North America, Amazon
- Jake Navarro, Director of Clean Transportation, National Grid
- Brian Martinez, Commissioner of Finance, City of Poughkeepsie

Ms. Reder introduced the panel moderator, Chris Irwin. Mr. Irwin thanked all those who contributed to developing and preparing the panel. He noted that interoperability is an amorphous subject. In systems with effective interoperability, things work smoothly. In systems without interoperability, there are integration needs and costs associated with that. He noted a DOE analysis done on its smart grid investment grants which found that approximately 30% of the funds intended for grid modernization went to system integration and interoperability instead.

Ivo Steklac said EVgo is the one of the country's largest EV charging companies, operating more than 1,700 public fast-charging stations in addition to commercial charging depots across 34 states. Mr. Steklac said a major barrier the company faces is how long it takes to move a potential charging station through the siting and permitting process. Currently, the process can take 18 months. To streamline the process, EVgo created a consortium called Connect the Watts that brings together planners involved in accelerating EV deployment. The consortium is intended to discover and promulgate best practices. Mr. Steklac noted that the EVgo network is intended to be as open and interoperable as possible.

Nate Hill spoke about Amazon’s fleet electrification and the challenges associated with that process. The company is committed to having net zero carbon emissions by 2040, and also has a “shipment zero” goal to deliver 50% of all Amazon shipments with net zero carbon emissions by 2030. The company is deploying more than 100,000 electric delivery vehicles by 2030. Mr. Hill noted that installing charging stations has been one of the more complicated and least flexible parts of the process.

Jake Navarro said National Grid focuses on three main EV customer segments: public and workplace programs, residential programs, and fleet programs. He noted that interoperability is an important piece of the puzzle, but that National Grid has bigger challenges in the short term. Primarily, fleet operators often do not have a plan for electrification. National Grid offers fleet assessment services to assist those operators. Mr. Navarro closed by suggesting several items DOE could work on to promote EV penetration and increased fleet electrification: a nationwide data source for fleet electrification roadmaps; minimum national standards for the granularity and accuracy of data that charging companies provide; and a centralized source for planning and information sharing for fleet/highway EV charging locations.

Brian Martinez discussed interoperability from the perspective of a small city. Dr. Martinez noted that one of the biggest obstacles to EV adoption is the lack of planning. In the City of Poughkeepsie, providing EV charging stations has been a major cost and has not produced revenue. Dr. Martinez outlined the data his city needs to make decisions about installing EV infrastructure. For the City of Poughkeepsie, data interoperability means being able to access and use data that may be siloed in different administrative databases. He recommended that DOE work on the following: 1) create, publish, and maintain EV policy implementation guidance for municipalities, 2) provide approved vendor lists, 3) define high-level use cases, 4) fund incentives, and 5) publish practitioner guides that characterize EV charging station participation for municipalities.

Discussion

Questions and Answers

Q1. Mr. Irwin noted that the guidance issued by DOE and DOT on the minimum size of charging networks is 150 kilowatts (kW) per stall and 600 kW minimum capacity per site. He asked how closely that tracks with the way EVgo constructs its sites.

Mr. Steklac replied that their stations are usually 350 kW power-shared, meaning that if two vehicles are drawing charge from the same station the flow will be split evenly into two 175 kW flows. The sites typically have four, six, or eight charging stations each.

Q2. Mr. Irwin asked Mr. Hill to discuss the best and worst interactions he has had with utilities in relation to installing charging infrastructure.

Mr. Hill replied that their interactions have been positive overall. He referenced the report *The Road to Fleet Electrification*,¹ which provides policy guidance to fleet operators and has also been a helpful resource to utilities when interacting with fleet operators.

Q3. Mr. Morrison asked if Amazon is looking only at its own fleet or also at EV-related retail customer products and services.

Mr. Hill replied that the company is focused on electrifying its own fleet at this stage.

Q4. Ms. Swaminathan asked Mr. Navarro to elaborate on the role equity plays in the transition to EVs.

Mr. Navarro said National Grid is working to promote access to EVs for all customers regardless of income level, in part through higher rebates and other incentives for low-income communities. For customers who may not be able to afford or may not want to own their own EV, National Grid's efforts related to electrification of city buses and school buses still benefit those customers.

Q5. Dr. Chen asked how plugged-in EVs might be able to provide grid services and potentially generate revenue for the municipality.

Dr. Martinez said the key takeaways for him were how to make decisions more quickly through data interoperability and visualizing new ways to partner (e.g., public-private partnerships and government-to-government partnerships).

Q6. Rick Mroz asked Mr. Navarro and Mr. Hill what DOE's role (e.g., as a convener) could be in setting interoperability standards, or whether industry should formulate its own standards.

Mr. Navarro said as EV penetration increases and more vendors enter the market, it is a challenge to ensure interoperability. He noted the parallel with energy efficiency equipment and the similar challenges around standardization that were largely addressed through the Environmental Protection Agency's ENERGY STAR voluntary labeling program.

Mr. Hill added that DOE can be a trusted source of information for helping fleet operators understand what interoperability is.

Q7. Mr. Steklac asked for National Grid's perspective on easements. He said that EVgo often encounters an approach to easements that requires permanent access to rights-of-way in perpetuity, which poses a major obstacle to siting public and private infrastructure on land that is not owned by the operator. He noted that Pacific Gas and Electric has a good practice called access agreements, which eliminate easements for EV infrastructure.

¹ California Trucking Association & Ceres. 2020. *The Road to Fleet Electrification*.

Mr. Navarro said it is important to differentiate the types of electric infrastructure involved in EV charging, including traditional utility-owned assets as well as customer-owned meters.

Q8. Dr. Kiesling referenced using competition policy, including antitrust and regulatory economics, to think about who owns what and who does what. One of the benefits often touted for interoperability is that it reduces barriers to entry and facilitates competition. She asked if having a regulated utility own and operate charging infrastructure crowds out competitive activity. She noted that the economic and legal precedent goes back to the AT&T divestiture in the 1980s, when the Justice Department ordered AT&T to divest its customer equipment branch because it was having an anticompetitive effect in the phone device market.

Mr. Navarro agreed it is an important topic and said it is an evolving area. He said National Grid's goal is to enable their customers to own EV charging infrastructure.

Dr. Martinez said he thinks incentives should be further explored, whether discounts in kW/hour rates, charging stations located in qualified census tracts, etc.

Mr. Steklac said EVgo invests fully in all charging infrastructure capital. It operates stations owned by third parties, including utilities and municipalities. He said a major challenge is predicting and achieving adequate utilization of the infrastructure to make the investment in said infrastructure financially viable. In terms of census tracts, he noted that there are interesting economic drivers. Currently, 45% of EVgo's deployed infrastructure is in disadvantaged and minority areas because many of the employees and personnel who operate EV fleet vehicles live in those areas. He noted that in California, EVgo has introduced regional pricing so that it can set lower prices in disadvantaged and minority communities. EVgo has also introduced time-of-use pricing that aligns with and matches what is practiced by the three major investor-owned utilities in the state.

Mr. Morrison said that before DOE takes on the issue raised by Dr. Kiesling in any policy documents, or policy-influencing documents, there would need to be a much longer discussion. He added the argument dates back at least as far back as the 1990s when Enron and other competitive entities argued that utilities shouldn't provide a wide range of customer-side resources or services, including retail metering. It is a very different thing to say that third parties can participate in a market than it is to exclude one class of competitors or service providers from participating in that market.

Dr. Kiesling agreed with Mr. Morrison. She noted that one important reason to pay attention to competition issues is that if utility participation in the charging market deters other participation, a likely outcome is slower vehicle electrification and slower vehicle-to-grid and vehicle-to-building penetration. Those outcomes are relevant to DOE's mission.

Ms. Allan noted that the resilience and reliability requirements of the grid make it a different situation from phone deregulation.

Q9. Ms. Flygt asked when customers are charging fleet EVs. That has important implications for time-of-use rates.

Mr. Steklac said it very much depends on the type of business. Most light-duty fleet vehicles are charged overnight. Other customers fast-charge vehicles for 60–90 minutes several times a day.

Q10. Ms. Frantzis asked about EV charging infrastructure security requirements, particularly ones associated with data exchange. She noted that DOE could play a role in guiding or proposing security requirements.

Mr. Steklac said EVgo follows existing National Institute of Standards and Technology (NIST) standards and also conducts third-party audits. Its primary privacy concern is consumer privacy.

Ms. Patterson noted that she has seen more and more public power utilities avoiding direct ownership of EV charging infrastructure and instead opting for third-party ownership.

Q11. Mr. Cummings asked if Mr. Hill has seen problems with interoperability in terms of charging Amazon’s fleet vehicles at different stations.

Mr. Hill replied that Amazon is in early-stage testing and will be scaling up integration in the coming years. He expects better information once it scales up its EV fleets.

Q12. Mr. Cummings asked if panelists had encountered situations where utilities do not have sufficient resource capacity to serve charging stations.

Mr. Steklac replied that EVgo has seen insufficient distribution capacity.

Ms. Reder referenced the challenge of having sufficient capacity to serve the increased EV penetration that is expected, saying that typical planning has been predicated on understanding load shapes relative to fixed loads. She sees two optimization challenges stacked on top of each other: charging infrastructure needs to be optimized to the extent possible, while grid transmission and distribution also need to be optimized. She sees a need for good data exchange regarding load shape, usage, and capacity. The need is much more dynamic than typical planning practices have contemplated. She added that relying on markets entails additional data requirements to facilitate a price signal.

Mr. Steklac said EVgo happily shares load shapes, but it rarely has access to capacity models to test against. Its interactions with utilities involve asking for a specific amount of electricity, and EVgo is not told how much more it could theoretically ask for. He sees substantial benefit for all participants in knowing where they can build out infrastructure and planning what that infrastructure looks like over time.

Mr. Navarro noted that at some point EVs will also begin feeding electricity back into the grid. He added that many charging station operators cannot provide granular data (e.g., 15-minute interval data).

Dr. Martinez said municipalities should be able to share standardized data that they acquire from EV infrastructure.

Dr. Bialek suggested that the panelists could contribute value by presenting use cases to DOE, especially ones that could serve as best practices for DOE to share with other stakeholders.

Dr. Martinez said his municipality would benefit from seeing such best practices.

Mr. Hill added that entities considering fleet electrification would benefit from easy-to-use planning tools to help guide them through that decision process.

Q13. Mr. Koplin asked how much Amazon has considered BTM fleet charging, which can provide resilience benefits by supplying electricity from plugged-in EV batteries to power facilities when central power sources are unavailable.

Mr. Hill said there are several hundred onsite solar installations at Amazon facilities to which they are just beginning to add storage. In terms of fleet EVs, they are looking for a scalable resilience strategy.

Mr. Navarro noted that he is seeing more vehicle manufacturers making vehicles that are capable of discharging back onto the grid.

Q14. Mr. Barbeau asked what is needed to enable a common vehicle-to-grid opportunity within a region but among different utilities. He also asked about the present and expected frequency of inter-utility routes and charging needs.

Mr. Navarro said most of the fleets National Grid works with are in a nascent stage and are not thinking about vehicle-to-grid capabilities. One of the biggest needs National Grid sees right now is for fast charging stations along highway routes.

Mr. Irwin added that in the route data area, the National Renewable Energy Laboratory has previously purchased access to trip and route data to inform charge from work and charge from home scenarios. The data are not free but are available.

Q15. Dr. Chen asked if there could be a way for charging stations to provide information about locational marginal prices and locational marginal emissions.

Mr. Irwin said there are entities investigating emissions tagging for energy use and energy production. He noted that emissions information is of value to society, corporations, and individuals.

Mr. Steklac said there are no technical limits that preclude charging stations from showing that information.

Q16. Chris Ayers asked if National Grid provides service to EV charging infrastructure through general service tariffs or EV-specific tariffs.

Mr. Navarro replied that National Grid does not have EV-specific tariffs currently but has proposed a demand charge alternative program in Massachusetts that can help alleviate some of the cost challenges faced by direct current fast chargers.

Q17. Ms. Allan asked Mr. Steklac to comment on OpenADR's 2.0b standard and the possibility of overlap with the Institute of Electrical and Electronics Engineers (IEEE) standard 2030.5.

Mr. Steklac said the Open Charge Point Interface protocol is used across EVgo's network as it interoperates with four other network providers. He is open to reviewing OpenADR 2.0b vs. IEEE 2030.5, but he thinks the salient first step is to identify grid interoperability needs, something that has not happened to date.

Dr. Bialek added that San Diego Gas and Electric reviewed communication protocols for smart inverters and chose IEEE 2030.5 because it was based on International Electrotechnical Commission standards and already had DER functions defined to provide services. He said OpenADR's standard did not have those capabilities and to his knowledge still does not.

Ms. Allan noted that Smart Electric Power Alliance (SEPA) recently paid NIST to produce an EV profile for demand management for 2030.5. The standards have gotten so flexible that an entity can operate its assets in compliance with the application protocol and still have a variety of configurations, so SEPA produced a profile to lay out how to configure the standard so that a utility with multiple chargers can use it in its program and the various chargers will all respond to signals properly.

Q18. Mr. Irwin asked for closing comments.

Mr. Steklac said EVgo would love to help DOE accelerate the deployment of EV charging infrastructure, particularly in relation to the sharing of information for capacity modeling and planning.

Mr. Hill asked DOE to keep fleet electrification in mind as part of broader transportation electrification planning, analysis, and evaluation efforts.

Mr. Navarro said National Grid is eager to begin building the infrastructure now that will be required to support the surge of fleet electrification that is expected.

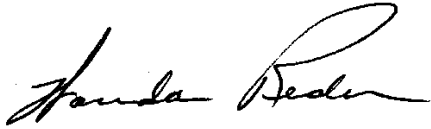
Dr. Martinez thanked DOE for all the work it does and the EAC for including the City of Poughkeepsie's perspective as a municipality.

Concluding Remarks

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

4/27/2022

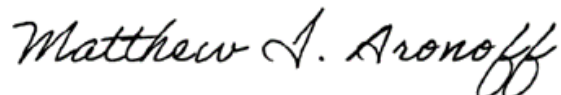
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Michael Heyeck
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Vice-Chair
DOE Electricity Advisory Committee

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