

**Summary Minutes of the
Joint Office of U.S. Department of Energy (DOE) and U.S. Department of Transportation (DOT)
Electric Vehicle Working Group (EVWG) Meeting**

In Attendance:

Pete Buttigieg**

Secretary, U.S. DOT

Jennifer Granholm**

Secretary, U.S. DOE

Robin Carnahan

Administrator, General Services Administration (GSA)

Louis DeJoy* *U.S. Postmaster*

General & Chief Executive Officer (CEO), U.S. Postal Service

Brenda Mallory*

Chair, Council on Environmental Quality (CEQ)

Shailen Bhatt* *Administrator,*

Federal Highway Administration

Gabriel (Gabe) Klein*

Executive Director, Joint Office of Energy and Transportation and Acting Chair EVWG

Dr. Rachael Nealer*

Designated Federal Officer (DFO) of EVWG and Deputy Director Joint Office of Energy and Transportation

Rakesh Aneja

Vice President and Chief of eMobility, Daimler Truck North America

Danielle Sass Byrnett

Senior Director, National Association of Regulatory Utility Commissioners

Michael Berube

Deputy Assistant Secretary for Sustainable Transportation and Fuels, U.S. DOE

John Bozzella

President & CEO, Alliance of Automotive Innovation

Charles T. Brown

Founder and Managing Principal, Equitable Cities LLC

Dean Bushey

Senior VP, of Sustainability TravelCenters of America

Laura Chace

CEO, ITS-America

Mark Dowd

Director for Zero-Emission Federal Vehicle Fleets, CEQ

Kevin Gotinsky

Top Administrative Assistant, EV Strategies Department, UAW

John Giles

Mayor, City of Mesa, AZ

Denise Gray

Industry Advisor, DKTN Consulting LLC Consultant, LG Energy Solution

Doug Greenhaus

VP of Reg Affairs, Environment, and Safety, NADA

Dr. David Haugen

Director of OTAQ's Testing and Advanced Technology Division, Environmental Protection Agency

Henrik Holland

Global Head of Prologis Mobility, Prologis

Joung Lee

Deputy Director and Chief Policy Officer, AASHTO

Nadia El Mallakh

Senior Advisor, Utility and Clean Energy Sectors

Barak Myers

Transportation and Strategic Planner, Eastern Band of Cherokee Indians

Kelsey Owens

Senior EV Policy Advisor, DOT Office of the Secretary – Office of Policy

Crystal Philcox

Assistant Commissioner, Office of Travel, Transportation and Logistics, Federal Acquisition Service, U.S. General Services Administration

Cassie Powers

Chief of Staff, NASEO

Mike Roeth

Executive Director, North American Council for Freight Efficiency Principal, NA Freight, Rocky Mountain Institute

Victoria Stephen

Director Next Generation Delivery Vehicle Program, Fleet Management & Electrification Strategy, United States Postal Service

Kofi Wakhisi

Team Leader, Atlanta Regional Commission

**Non-EVWG Member*

***EVWG Chairperson*

Date and Time: December 12-13, 2023
Location: U.S. DOT Headquarters, 1200 New Jersey Ave SE Washington D.C. 20590
Purpose: EVWG Meeting
EVWG Staff: Dr. Rachael Nealer (DFO), Rachael Sack (Facilitator), Sara Emmons (Deputy DFO), Michael Scarpino, Stephen Costa, Julie Nixon, Kim Washington

Meeting Summary

This is a EVWG meeting convened under the Joint Office of Energy and Transportation. The meeting was conducted in person at the U.S. DOT Media Center and via video conferencing. The meeting was called to order at approximately 1:00 pm. EDT. The meeting was attended by 23 members of the EVWG, Joint Office officials, federal agencies' leadership, and the public (virtually). Opening remarks were made by the Joint Office, followed by EVWG member introductions. Members of the public were in listen-only mode.

Opening Day 1

Dr. Rachael Nealer welcomed all the members including those who couldn't attend the last meeting and reviewed the agenda and the ground rules for the Q&A period. Public members were muted for the first day but were welcome to speak during the public comment period on Day 2 of the EVWG meeting.

Welcome for Secretaries

Gabe Klein expressed gratitude for the presence of secretaries Granholm and Buttigieg and acknowledged that without them, a partnership between DOT and DOE would not have been possible, and silos between energy and transportation would not have been broken down. **Mr. Klein** also mentioned the importance of the work the EVWG has been tasked with and requested input and feedback from everyone present. Finally, **Mr. Klein** welcomed both secretaries Buttigieg and Granholm.

Secretary Charge for the EVWG

Secretary Buttigieg welcomed Mr. Klein to the DOT headquarters. He highlighted the importance of electric vehicles (EVs) in decarbonizing transportation and mentioned the possibility of developing completely different forms of propulsion for aviation by the 2050s. **Secretary Buttigieg** emphasized the importance of keeping up with innovation and the need to embrace the changes that come with it. He affirmed that an EV policy and hard work can help us meet the climate challenge, make EV ownership equitable, and make EV adoption a made in America revolution. **Secretary Buttigieg** informed the audience that the first National Electric Vehicle Infrastructure (NEVI) Program charger was recently launched in Ohio, and reminded everyone that this new and challenging initiative will require close collaboration with all stakeholders to ensure its success. **Secretary Buttigieg** introduced Secretary Granholm, acknowledging the extraordinary insight and energy she has brought to the leadership of the DOT and DOE interagency collaboration.

Secretary Granholm expressed her appreciation to Secretary Buttigieg, Mr. Klein, Dr. Nealer, and their entire staff for their work on combining two offices and the progress made so far. The DOE focus is on transitioning to EVs in the most challenging areas, such as heavy-duty and medium-duty vehicles, and increasing battery sizes. The government is investing \$10 billion to upgrade the electric grid and deploy clean energy to power clean vehicles. The EVWG will assist in answering difficult questions, offering recommendations, and ensuring the use of the right metrics. Tax credits are available for the purchase of EVs and larger trucks, which has increased EV demand and production in the country. The Inflation Reduction Act and the Bipartisan Infrastructure Law have received approximately \$150 billion worth of investment in communities across the United States. Public-private partnership is crucial for success; the clean energy transition is private sector-led, government-enabled.

Leadership Discussion with the EVWG

Mr. Klein expressed gratitude towards Secretary Buttigieg and Granholm for their inspiring comments. He commented on the importance of designing and building projects in a win-win-win manner, which means everyone benefits from it- a core philosophy of the current administration. Mr. Klein transitioned to the next segment with special guest remarks.

The White House Council on Environmental Quality Chair, **Brenda Mallory**, discussed the council's efforts to advance sustainability across government equitably. She also mentioned that the Biden-Harris administration has set a goal for federal agencies to acquire 100% zero-emission vehicles for all light duty vehicles by 2027, and they are on track to achieve that. **Chair Mallory** expressed gratitude towards the EVWG for their contributions and shared the importance of partnering with them to achieve their goals. She concluded by thanking everyone and looking forward to the discussion.

Administrator Robin Carnahan of the General Services Administration (GSA), spoke about the progress in transitioning the GSA's fleet of vehicles to electric. She mentioned that in 2001, only 1% of their fleet was electric, whereas in 2021, it has increased to 18%. The GSA is also investing in innovative technologies, including the Green Proving Ground program, which supports companies focused on creating efficiency. Additionally, the GSA uses its buying power to make markets in the EV and charging infrastructure space. **Administrator Carnahan** also mentioned the GSA's role in ensuring security protocols for anything connected to the cloud through a FedRAMP program. Finally, **Administrator Carnahan** shared her hope to learn from others about how to standardize infrastructure, payment protocols, and grid integration to accelerate the transition to EV.

Louis DeJoy, U.S. Postal Service Postmaster General, highlighted the scale of the organization, which includes 31,000 retail centers, 19,000 delivery units, 400 processing centers, and 50,000 trucks loaded daily to deliver mail and packages to 165 million locations across the nation. He spoke about the organization's initiatives to align service improvements, sales growth, network modernization, and cost reduction with reducing carbon emissions. **Postmaster DeJoy** shared his excitement about the future and thanked Brenda Mallory and her team, Andrew Mack, Mark Dowd, and the Senior White House advisor, John Podesta, for working with them to understand their organization's condition and goals for climate change.

Following the special guest remarks, **Gabe Klein** revealed the Secretary's charge for the EVWG and proceeded with the first leadership discussion question. When considering the biggest obstacle to EV adoption, Gabe Klein asked whether it is cost, access, or infrastructure.

Barak Meyers, who spoke on behalf of tribal nations, spoke to the importance of developing sustainable communities that could support EVs. Since many reservations are in remote areas with inadequate infrastructure, electrification of homes and establishing infrastructure for EVs are essential. Providing education and technical assistance is crucial in building and maintaining the grid and employing people to work on EV stations. Funding for infrastructure and building technical expertise is necessary to achieve these goals.

Nadia El Mallakh, a representative of the utility industry, discussed the challenges and opportunities of electrification of transportation. She mentioned that access, cost, affordability, and infrastructure are the major issues to consider when electrifying everything. The cost structures can vary depending on the location and the state of the health of the grid. It is essential to look at the electrification of transportation as one critical piece as we move towards a carbon-free generation. The fundamental backbone of being able to have the buildout that we need is the distribution system. Nadia commented how crucial it is to consider how battery storage and EVs will work together in the future.

John Bozzella expressed his gratitude to government officials and private sector representatives for coming together to discuss the need for infrastructure, supply chain, and affordability in the EV industry. He stated there should be no compromise in mobility and that EVs should be available, reliable, affordable, and accessible to customers. He also highlighted the importance of American manufacturing and the supply chain of critical minerals, raw materials, and components to support it. He believed that the availability of infrastructure and a supportive supply chain would create an opportunity for affordability, essential for EVs to become mainstream.

Kevin Gotinsky, representing labor organizations, thanked the attendees and discussed the biggest concerns for the United Automobile Workers (UAW) and their members. According to him, the biggest issue for the UAW members is the cost of purchasing EV vehicles, which are priced significantly higher than internal combustion engine (ICE) vehicles. He also highlighted the need for a well-developed infrastructure and charging network for EVs to gain consumer acceptance. Kevin believes that the availability and accessibility of charging stations will help consumers trust EVs and encourage them to purchase them.

Doug Greenhaus, on behalf of automotive dealing, raised the issue of education and knowledge among the general public. He pointed out that while those in the room may be experts on EVs, most motorists need to know more about EVs and charging infrastructure. Doug suggested the government focus on a nationwide public education campaign to help people learn more about EVs. He added that while dealers can provide specific education on the vehicles and how to charge them, the government needs to help get people to the dealerships. While fleet customers have different requirements, each family has a unique duty cycle for their vehicle. He also acknowledged that EVs cost more than ICE vehicles but highlighted the tax credits and financial assistance available at the federal, state, and utility levels that can make EVs more affordable. **Secretary Buttigieg** asked a follow-on question about the two to three things that consumers are most surprised about? **Doug Greenhaus** indicated myths about EV range, availability of charging, and cost, as well tax credits that need to be dispelled.

Rakesh Aneja, representing the commercial vehicle industry for medium and heavy-duty vehicles, provided statistics on the industry's unique needs for decarbonization and spoke to three factors required for decarbonization: vehicle products and technology, infrastructure, and cost of ownership. Although some vehicles meet the requirements of particular use cases, it takes several years to develop the necessary infrastructure. In addition, the high cost of ownership makes it difficult for customers to switch to these vehicles. Producing battery cells and batteries locally in the United States and increasing their production could help reduce their costs.

Charles T. Brown, representing climate equity, noted his concern about the amount of misinformation and disinformation surrounding EVs, leading to fear among people about potential threats to their personal choices and liberties. He suggested that debunking and dispelling the myths associated with EVs could help address this issue.

Cassie Powers, who represents state energy offices, acknowledged that consumer awareness is the most significant barrier to adopting EVs. She stated that infrastructure investment, including the NEVI program's charging and fueling infrastructure grants, is critical to overcoming this barrier. She also stressed the importance of ensuring that the grid infrastructure can accommodate the increase in load expected with the rise of EVs. Finally, she noted the need for a policy framework to provide market certainty to industry and actors to meet investment needs.

Danielle Sass Byrnett, representing public utility regulators, highlighted affordability as the biggest challenge. She raised concerns regarding the impact on low-income customers and the amount ratepayers will have to absorb to invest in the traditional utility structure.

Dean Bushey, who represents transportation fueling distribution, shared concerns about the profitability of the charging infrastructure industry. He noted that the cost of electricity, the timeline for permitting, and medium/heavy-duty utilization were some of the factors that made it difficult to profit in this industry.

Henrik Holland, representing the property development industry, shared challenges of energy availability from local utilities and the grid's limited capacity at the distribution level. He also mentioned customers' struggle with the total cost of energy delivered and the misalignment of capacity charge tariffs, demand charges, and time of use rates with EV usage in the commercial space.

Secretary Granholm asked the group to discuss electric vehicle myths and fears. The EVWG shared their concerns and opinions regarding the issue. **Charles T. Brown** raised awareness about the public's fear of the cyber component and intentional disinformation surrounding autonomous and EVs. **Kevin Gotinsky** shared the positive response of electric truck drivers, while **Laura Chace** noted that some people fear electric vehicle tracking and disabling by the government. **Denise Gray** added that people may fear change, but regular communication with the public can help counteract these fears.

The EVWG discussed the need for a robust cybersecurity system and data privacy to build public acceptance of EVs. They raised a follow-up question about the responsibility of educating people. The EVWG agreed that trust is an indispensable element for effective education and suggested creating a "malarkey corner" linked with trustworthy individuals or groups to have a more significant impact. The group sought opinions on whether the federal government should solely be responsible for this task or if other individuals or groups could take on this role.

John Giles recognized that the movement towards using EVs is gaining momentum, but cost remains a significant barrier to broader adoption, and a perceived class divide is associated with EVs. **Kofi Wakhisi** shared concerns about the cost of ownership and the price of battery replacement. **Joung Lee** talked about the conflict between infrastructure funding and the transition to EVs. However, he appreciated the leadership shown by those involved in the conversation and shared how state DOTs are excited about the deployment of EV charging infrastructure in Ohio.

Gabe Klein expressed his gratitude for everyone's presence and participation. He emphasized the importance of public perception and suggested the possibility of collaboration between the federal government and stakeholders to enhance it. The participants discussed the grid capacity, noting that while level 2 charging is less of a strain, DC fast charging requires more attention. They also highlighted the need for myth-busting and expertise in specific communities to promote EVs. The Secretary's segment concluded with a group photo.

USPS Next Generation Delivery Vehicle Battery Electric Vehicle (BEV)

Postmaster General DeJoy, unveiled a BEV that was put on display in front of DOT Headquarters. The EVWG had the opportunity to tour the vehicle and then took a break.

Break 2:10- 2:45

Presentations on Electrification

Dr. Nealer reconvened the EVWG meeting with speaker introductions, who presented their views on the EV market. **Shailen Bhatt**, Federal Highway Administrator, discussed the Federal Highway programs

and DOT's initiatives. **Michael Berube**, Deputy Assistant Secretary for Sustainable Transportation and Fuels discussed decarbonization blueprint work and electrification technologies. **Elizabeth Krear**, Vice President of Electric Vehicle Practice at JD Power, presented data on the electrification market and public perception of it. **Mike Roeth**, Executive Director of the North American Council for Freight Efficiency, discussed developments in the medium and heavy-duty market. The attendees had a brief Q&A session after each presentation and were encouraged to get in touch for further information.

Following Shailen Bhatt's presentation, **Nadia El Mallakh** commented on the importance of collaboration between utilities, the Federal Highway Administration, and local DOTs. **Shailen Bhatt** shared his experience of putting up chargers on highways and coordinating with utilities to ensure enough capacity to charge the vehicles. **Crystal Philcox** shared her interest in working on standardization, which Shailen Bhatt echoed. The speakers stressed the importance of infrastructure reliability and cleanliness in building electric vehicle charging stations. **Gabe Klein** discussed the ChargeX consortium's efforts to improve the existing 24 month term experience. **Doug Greenhaus** brought up the lack of transparency in pricing for public charge systems. **Shailen Bhatt** wrapped up the conversation, acknowledging the importance of EVs and thanking everyone for their work.

Following Elizabeth Krear's presentation, **Kofi Wakhisi** inquired about the survey data on where people charge their EVs. **Elizabeth Krear** explained that they asked participants about charging frequency at home, in public, and at work. She also mentioned that the data was stratified based on whether the participants were single-unit homeowners or multi-unit dwellers. **Kofi** expressed interest in discovering how many chargers were in single-family households and multi-family dwellings.

Dr. Nealer concluded Day 1 of the EVWG meeting following Mike Roeth's presentation. She encouraged participants to contact the presenters if they had further questions.

Opening Day 2

On the second day of the EVWG meeting, the DFO, **Dr. Nealer**, reminded the attendees that the meeting was being recorded and would be published on the EVWG page on DriveElectric.gov. **Dr. Nealer** reviewed the agenda. **Rachael Sack** gave a safety briefing and reviewed meeting logistics. The objective for Day 2 was to have further discussions on the Secretary's charge.

Dr. Nealer recapped the inaugural EVWG meeting in September, where the group established a priority list which focused on three main areas: medium and heavy-duty electrification, grid integration, and charging network. She provided an overview of the EVWG progress and first report which will be a high-level roadmap and update of the group's priorities. The EVWG will continue to produce reports every two years as required by legislation, but they also have the flexibility to produce quick turnaround requests if needed. **Dr. Nealer** also discussed the importance of engaging subcommittees and stakeholders to provide recommendations to the government. Overall, the group hopes to have robust discussions and produce a variety of products in addition to the required reports.

Michael Berube stated that the EVWG report deliverables are required, but not the only way to provide input. He also mentioned that if the group has any key input, they can vote on it and deliver it at any time. **Dr. Nealer** added that they should deliver things that the government can take action on and aim to work together with industry. At the end of the second report, the EVWG will disperse as stated in the legislative language.

Mike Roeth asked about the guidelines and ground rules for the subcommittees. **Dr. Nealer** explained that subcommittees allow a broader set of stakeholders to participate, who are not technically EVWG members. She also mentioned that any products developed by the subcommittees need to be approved by the EVWG before submitting them as recommendations to the government.

Building the Framework for Subcommittees

Dr. Nealer explained that the subcommittees would be organized based on an initial framework, but there is flexibility. She stated that based on the EVWG membership applications received and high participation on the calls, that there would be an opportunity to engage with Non-Governmental Organizations (NGOs) outside of the EVWG. **Sara Emmons**, the Deputy DFO, clarified that the subcommittees could coordinate meetings without the formal process of creating a federal register notice. This provides a more flexible way of coordinating. Additionally, subcommittees can interview outside entities, which is not possible in formal meetings. **Sara** also mentioned that additional guidance would be forthcoming.

A discussion between **Laura Chace, Dr. Nealer, and Joung Lee** led to a question about whether critical gaps or areas where the federal government could have a more short-term role could be included in the recommendations. **Dr. Nealer** stated that as an advisory committee, it was up to them to decide what they wanted to recommend to the government. However, they would also need to consider what is reasonable and realistic for the government to act on. She suggested that they have conversations about it, especially since they have federal representation on the EVWG. **Dr. Nealer** also discussed the group's ability to coordinate with the Volpe Center, Transportation Research Board and the National Academies.

The group identified three topical areas: grid integration, medium and heavy duty, and charging network. While these areas will have different timelines, they will have similar crosscuts with equity, workforce, and supply chain. The group aims to create actionable recommendations and solutions, and to identify who will take the necessary actions. **Dr. Nealer** emphasized that the wording of their initial report should be intentional. **Danielle Sass Byrnett** suggested that cost or affordability was a missing piece in the current plan. She recommended that the plan should include an overarching consideration of cost or affordability in some way. **Dr. Nealer**, in agreement with **Danielle**, suggested that affordability could be a metric to measure the success of the EV ecosystem. The group discussed how to integrate the Secretary's charge, which includes affordability and other metrics such as life cycle assessment and emissions, into the plan. **Laura Chace** raised the question of cybersecurity and suggested that it should be included in the plan as a core consideration under charging network and grid integration. The group discussed the importance of trust in relation to cybersecurity and agreed to consider adding the word "secure" to address this concern.

Nadia El Mallakh discussed sub terms to sustainable, which include resilient, secure, and affordable. **Dr. Nealer and Nadia** agreed that defining overarching terms would add clarity for metrics. **John Bozzella** agreed with the importance of metrics and pointed out that affordability and cybersecurity are critical, especially in the integration of the charging network in the vehicle. He also cautioned against adding too much verbiage to the conversation and suggested that the working groups tackle these issues and come back to take another look.

John Giles praised the work product that summarized their priorities. He expressed concern that feedback could lead to a less effective end product. He noted that the purpose of the meeting was to facilitate widespread vehicle electrification but stated that this was already happening. He stated the importance of benefiting the public in their efforts towards electrification. **Rakesh Aneja** suggested that there are many Environmental Social and Governance (ESG) relevant metrics that can be considered, such as cost of ownership and life cycle assessment. He mentioned the importance of circular economy and human rights issues associated with batteries and electrification. **Cassie Powers** proposed exploring the role of government and industry in supporting consumer education and awareness, which had been discussed earlier. Overall, the EVWG recognized that their collective value would be amplified through coordination of outreach efforts already underway.

Mark Dowd noted the importance of focusing on the "how" rather than just the "what" when it comes to turning over 600,000 vehicles. **Dr. Nealer** agreed that there was an urgency to move quickly towards figuring out the technical details and logistics of making EVs more interoperable and reliable. They highlighted the need to establish a scope, involve the right stakeholders, and flesh out actionable recommendations, but the group agreed that the devil is in the details and getting to the "how" is crucial.

Crystal Philcox stated the importance of creating a standard charging station experience for EV owners and drivers across the country. She challenged the EVWG on how to achieve a standardization that would bring more trust in the system and ensure that the charging stations are for public good

Kofi Wakhisi expressed the need for a curated list of research and initiatives related to the topic. **Dr. Nealer** agreed with the suggestion to take time to scope out what the topic means to them. She also mentioned that they will request presentations from government agencies and industry on their products related to the topic and continuously feed information to make relevant recommendations.

John Bozzella mentioned that while public education is important, there are already many organizations and industry sectors doing it. He said there is a need for reliable, accessible, and affordable infrastructure that supports more vehicles every day. John believes that making charging infrastructure publicly available is the most important educational task that the group can take, as it is what consumer research suggests. He noted that when people see charging infrastructure readily available, they are more inclined to consider purchasing an electric vehicle, as it indicates that the technology is ready.

Dr. Nealer thanked everyone for their initial thoughts and **Rachael Sack** provided instructions for the guided subcommittee breakout sessions.

Break 9:30 9:45

Subcommittee Breakouts

Rachael Sack asked EVWG participants to write down their top two topics for each of the three subcommittees. The attendees were given an hour to prioritize their ideas and define their goals for their respective subcommittees. The attendees were then divided into three groups to discuss their ideas and goals in detail. Each group was led by a representative who would give a report out of the discussion afterwards. The virtual meeting was paused for breakout sessions.

Rachael Sack asked the first of three breakouts, led by **John Bozzella**, to report back to the EVWG about the charging network group's next steps and prioritized decisions.

Charging Network Subcommittee Report Out & Group Discussion

John Bozzella presented the ideas of the charging network subcommittee. The main objective is to determine the optimal locations to build charging stations in urban and rural areas while ensuring the grid capacity supports their dispersion. Their investigation covers three categories: where to build, how to build, and operations, which underlines the supply chain, accessibility to funding and permits, and interoperability crosscuts between the charging network and the vehicle itself. John echoed the need to establish metrics to define public good and set minimum standards to communicate important information to consumers. He also highlighted the importance of standardizing public planning concerning building codes, zoning, permitting, and other aspects.

Denise Gray mentioned that Bethany Jones from the DOE handles workforce development. **Rachael Sack** also noted that the quick and affordable grid upgrades align with the charging network.

Dr. Nealer continued the discussion by mentioning the importance of knowing when to make decisions and take action since the network is constantly evolving, and perfect information may not always be available. She suggested that the EVWG go beyond the minimum standards to ensure a consistent experience for the customer. **John Bozzella** added that there should be a real-time indication of the standards, which is transparent to the customer, such as a digital representation or seal of approval.

There was a discussion about cyber and data access in building, operation, and reliability. **Laura Chace** mentioned that cyber standards are insufficient and that more must be done to ensure safety and security. **Charles T. Brown** expanded the topic of security to include not just cyber but also safety and physical security. **Dr. Nealer** agreed on the importance of physical security. **John Bozzella** found the discussion helpful and thanked the others for their input.

Nadia El Mallakh suggested that information should be shared early and often, especially with local utilities. **Laura Chace** raised a question about the siting of charging stations and whether considerations given to ancillary services could be barriers for parents with small children. **Dr. Nealer** noted that neighborhoods that discriminate against race are perceived as unsafe. She emphasized the importance of well-lit stations and ensuring accessibility for people with various levels of disability. Overall, the group discussed the need to consider multiple factors such as gender, race, and ability when designing and siting stations.

Charles T. Brown, Mark Dowd, and Dr. Nealer discussed a range of topics for the government to address. **Charles** argued that equity should be integral to all government initiatives, including accessibility, reliability, and sustainability. **Mark** shared the challenges faced by the federal side in creating cyber standards and how they work with the industry standards and National Institute of Standards and Technology (NIST) to set minimum standards. **Dr. Nealer** remarked on the importance of collaboration between various agencies and organizations working towards solving different cyber solutions, mentioning the involvement of DOE's Office of Cybersecurity, Energy Security, and Emergency Response (CESER), the Joint Office, the White House's cyber mandate, and NIST in the process. The group agreed to stay updated on the ecosystem of cyber initiatives to break down silos and collaborate more effectively.

The group discussed the involvement of the Department of Defense (DOD) in cybersecurity policies for vehicles, as well as the National Highway Traffic Safety Administration's (NHTSA) cyber policies and requirements for vehicles. They also touched on the White House group's focus on energy generation and production, including EV charging. The group expressed urgency in addressing potential cyber threats to the charging network while considering prioritization and reasonable actions. The subcommittee agreed to meet again soon to prioritize and pull in additional resources as needed.

Before closing out the morning session, **Dr. Nealer** suggested the EVWG focus on initial steps to avoid taking on too much at once. The team agreed to identify three next steps per subcommittee and to appoint a lead person responsible for sending emails and scheduling meetings. They also discussed the importance of identifying their needs and empowering subcommittees to work on specific tasks between meetings. **Dr. Nealer** suggested that they could invite experts to give presentations on particular topics if needed.

Break 11:45-1:15

Grid Integration Subcommittee Report Out & Group Discussion

Nadia El Mallakh grouped feedback into eight categories: supply chain, speed, regulatory, affordability, education/business models, grid readiness, partnerships, and clean/carbon-free. The feedback indicated

that partnerships will be crucial for grid readiness. **Nadia** discussed four areas: grid readiness, comprehensive planning, transparency/education/roadmap, and partnerships.

Nadia El Mallakh highlighted the importance of considering crosscutting themes such as equity, workforce focus, and metrics. The subcommittee also added affordability, speed, and data. These themes impact the four key areas of focus: grid readiness, comprehensive planning, transparency/education/roadmap, and partnership. She indicated that it is crucial to remember these themes when working on projects related to these areas.

The subcommittee identified baselining, which requires understanding the current tools available from the federal government, private sector, and NGOs. The aim is to have a view of the available tools to understand the baseline settings. For this, **Nadia El Mallakh** introduced the group's three-step process. The initial step is to perform a gap analysis to recognize where something is missing and what is required. The following step utilizes the gap analysis outcome to determine the metrics used. Lastly, the third step establishes the metrics.

Nadia El Mallakh also discussed the importance of grid readiness, which encompasses a range of factors such as supply chain, transformer availability, and lead times. She noted that the industry experienced a 400% increase in lead time for transformers after the pandemic and suggested that the federal government could help address this issue. The discussion also touched on the importance of permitting and making no-regrets investments in technology to ensure grid readiness.

She emphasized the importance of comprehensive planning for the transition to EVs and the broader energy transition. She highlighted the need to consider rural versus urban needs and medium heavy-duty versus light-duty vehicles. In addition to transportation, the comments stressed the importance of considering the buildings' electrification and the natural load growth that will come through data centers and economic development. **Nadia El Mallakh** said that looking at the whole picture is crucial and not just planning for one piece in isolation. The transition to EVs is an integral part of the broader energy transition, a once-in-a-lifetime event requiring critical thinking.

She also highlighted the significance of transparency in comprehending the suite of programs, incentives, and rates. The participants were interested in developing a centralized information hub, to assist people in understanding the available options. The discussion also touched upon the importance of forming partnerships between different entities, particularly in understanding the business models of specific industries and utilities. The group also discussed prioritizing short-term actions to move forward with particular components before 2025. They plan to meet again to discuss potential activities.

Nadia El Mallakh concluded the discussion about grid integration by outlining immediate steps to take regarding federal programs such as Electric Power Research Institute and Edison Electric Institute. They aimed to have an inventory of these programs by January and discussed leveraging the work done by other organizations and non-profits to avoid duplicating efforts. The team also discussed potential short-term steps to address supply chain issues. They plan to discuss further steps and ideas when they reconvene.

Laura Chace asked if the grid readiness or comprehensive planning addresses the misaligned timelines and incentives between some transportation sector and utility sector investments and regulations. **Nadia El Mallakh** acknowledged that they have discussed this issue and that there is a need for alignment between the industries. She also mentioned the importance of education and finding interim solutions while working on building out the grid and substations.

Rakesh Aneja and **Nadia El Mallakh** discussed the challenges of the multi-year timeline involved in the traditional business process of customers ordering for a particular site. They talked about the need for a

paradigm shift in this process to anticipate future demand for EVs and make investments proactively. They also discuss the concept of "no regrets investment" and how it can help in making investments based on where there are concentrations of medium and heavy-duty fleets and how they anticipate these will evolve in the future. They suggested replicable components and sizing standards exist, although each site is unique. They also discuss the need for megawatt charging standards for medium and heavy vehicles, which require larger loads and specific grid integration considerations.

John Bozzella talked about identifying metrics that unify all work groups in the auto industry sector. He suggested that there are probably two or three key metrics that, if measured, focused on, and solved, can help bridge the gap between aspiration and reality in the industry. **John Bozzella** also mentioned the growth of the light duty EV market and the need to address the charging network gap.

Laura Chace discussed the possibility of using vehicle-to-grid technology solutions to put power back into the grid. There are considerations for customer-sited and distributed energy resources. She suggested that school buses could be a great use case for this technology, and all three groups (utilities, auto industry, and others) need to work together on this for the longer term.

Dean Bushey, Mark Dowd, and Nadia El Mallakh discussed the requirements and issues (e.g., onsite storage, grid issues) for battery backup systems, microgrids, solar, and local power, focusing on California.

Medium- and Heavy-Duty Subcommittee Report Out & Group Discussion

Mike Roeth led the debrief of the medium- and heavy-duty subcommittee. The group discussed their decision to focus on classes six to eight vehicles, which include medium and heavy-duty trucks, transit buses, and freight movement. They also discussed the possibility of incorporating more vocational types of trucks like garbage trucks and snowplows.

Additionally, the group discussed including class three to five vehicles, such as delivery vans, as part of the overall effort. They discussed standardization, including charging port locations, software, Application Program Interfaces (APIs), vehicle specifications, and charging networks.

Finally, they discussed early high-volume market segments happening quicker than others, suggesting regulatory considerations and the need for a significant amount of power with high-speed charging for depots, addresses, or truck stops. They also discussed the misalignment and government incentives for utilities, infrastructure, and vehicles.

Mike Roeth concluded the medium and heavy-duty segment, noting the scope of an EVWG's activities in the trucking industry. The group discussed what was in and out of scope, including workforce development, total ownership cost, and hard trucking segments. They also talked about bridge fuels like renewable natural gas and hydrogen.

The group plans to define priorities and sequence activities, including vehicle specifications, standardization, and charging demands. They also plan to make statements about hydrogen fuel cell EVs and regulatory considerations.

Kelsey Owens asked for ideas and best practices to help fleets reorganize their work to allow electrification. **Crystal Philcox** mentioned that they have been talking to hydrogen fuel distributors and that the Seattle-Canada corridor, including trucks, is almost entirely built. They also acknowledged that the group is called the EVWG but suggested they should not exclude other industries like hydrogen fuel distributors.

Dean Bushey, Crystal Philcox, Mike Roeth, and Rakesh Aneja discussed the topic of hydrogen fuel cells and their use in vehicles. While **Crystal** talked about liquid hydrogen distribution stations, **Mike Roeth** mentioned that the whole industry is currently working on the pros and cons of using hydrogen in an engine or fuel cell. They felt EVWG should focus on battery electric and hydrogen fuel cell electric. **Rakesh Aneja** noted that fuel cell vehicles may be considered EVs since their drive train is electric. They agreed that while hydrogen is an important technology, it can be addressed later in a separate position paper or statement.

Danielle Sass Byrnett, Mike Roeth, and Laura Chace shared the importance of data sharing for medium and heavy-duty trucks and grid integration. They noted that trucks are now data factories and that it's easy to forget to let the data lead the way. They discussed the need for digital handshakes, data standards, APIs, and other systems allowing information sharing. Furthermore, they stressed the importance of planning differently and proactively, with data sharing that supports planning. They mentioned the need for both data and customer information, as well as previews to utilities about anticipated truck depot capacity needs in the next one to five years.

John Bozzella, Mike Roeth, and Rakesh Aneja discussed the regulatory dynamics in the EV space for light and heavy-duty vehicles. The group acknowledged that regulatory factors could drive EV adoption and market readiness, and it's essential to understand how industry investment and regulation can be drivers of market readiness. The group also discussed the Joint Office potential for a win-win situation for manufacturers and customers if regulatory elements like product availability, infrastructure readiness, and cost elements are incentivized at a high level. **Rakesh Aneja** and **John Bozzella** agreed that regulatory pieces must be firmly in scope. **Dr. Nealer** and **John Bozzella** discussed the importance of federal, state, and local regulatory agendas to do their job well. They also talked about the opportunity and risk involved in regulatory discussions and how aligning to achieve what they agree to is important.

Nadia El Mallakh, Dr. Nealer, and Mike Roeth covered several topics related to regulatory, grid readiness, equity, workforce development, and supply chain considerations for medium and heavy-duty vehicles. **Nadia** discussed the assumption that regulatory jurisdiction would remain within federal, state, and local jurisdictions while identifying best practices. She also highlighted the need to think comprehensively about grid readiness for all types of vehicles, including those powered by hydrogen. **Dr. Nealer** raised concerns about the equity and workforce development aspects of medium and heavy-duty electrification, especially in disadvantaged and underserved communities. **Mike Roeth** acknowledged the importance of these concerns and the need to address them intentionally. He also discussed the importance of winning the hearts and minds of the trucking industry by making clean vehicles more accessible to drive.

Laura Chace discussed the workforce needs in the medium to heavy-duty space. She mentioned that two different work streams are happening in heavy-duty trucking and transit, school buses, and that the workforce needs will be sequenced. She stated that workforce needs are already seen in the transit school bus space, whereas it's a longer lead item in the trucking space. She explained that in the private industry and public agency world, the workforce needs are ongoing and real. Finally, she suggested that a sequenced approach might be necessary to address the workforce needs effectively.

During a conversation between **Mark Dowd** and **Mike Roeth**, the topic of regulations impacting heavy-duty and light-duty vehicles was brought up, with **Mark Dowd** suggesting they avoid discussing it. The conversation then shifted towards adopting electric and hydrogen fuel cell trucks and the potential investment in these technologies. **Mike Roeth** argued that both technologies would likely coexist and urged early adoption of battery electric trucks while still considering the potential benefits of hydrogen fuel cell trucks. **Mark Dowd** raised concerns about the complexity of investing in these technologies, particularly for trucking companies with compliance issues, and how this could impact climate change.

The conversation also touched on the natural gas idea and renewable natural gas as a potential bridge to zero-emission technologies. The two agreed that there is no easy solution to the industry's conundrum and that a decision similar to the one made by the Obama administration regarding the auto industry's competing technologies may need to be made.

Mike Roeth talked about creating position papers or statements from their subcommittee around some of the points that were raised. **Rakesh Aneja** mentioned that there is a generational effect within a particular propulsion technology where the technology improves with every generation. This makes customers decide whether to wait for the next generation for cost improvements or invest right now. Moreover, they also consider the current generation's backward compatibility, parts, and service support.

Joung Lee raised concerns about heavy-duty EVs and their impact on infrastructure. He explained that even conventional heavy-duty trucks are subject to weight limits, and the added weight factor for heavy-duty EVs is already causing concern. Lee suggested that separate weight limits for EV trucks may be needed, but this would raise questions about infrastructure readiness. Lee also pointed out that even non-heavy-duty vehicles can face restrictions based on weight, citing the example of Connecticut DOT banning Rivians on some parkways. **Mark Dowd** added that the shift to all-EVs, such as the Ford E Transit, can also impact weight classifications.

Nadia El Mallakh shared that workforce development is a potential partnership opportunity for everyone involved. She noted the importance preparing the workforce to support the transition towards new technology. She suggested it should be a priority for all the communities, utilities, auto, and truck companies. **Nadia** believes that it is critical to start working on this issue now and that it should be a shorter-term goal to get started on. She thinks it is a great opportunity to partner and should be considered seriously.

Kofi Wakhisi expressed concern about public safety regarding a regional plan and requested a risk assessment. **John Giles** agreed and suggested that the National Fire Chiefs Association needed their support due to significant public safety issues. **John Bozzella** mentioned they were already working with fire organizations to educate them about technology and develop best practices and training modules. **Doug Greenhaus** agreed with the concerns and added that high voltage systems under the hood should also be considered a cross-cutting issue, and emergency responders should be well-trained in dealing with them. The EVWG could benefit from a briefing on the current work and identify any gaps that must be addressed.

Dean Bushey stated that safety should always be the top priority for truck stops, especially since they are already at capacity. Introducing alternative fuels and reducing more flammable or highly combustible fuels could affect the operational flow of the truck stop. **Victoria Stephen** agrees with the importance of safety. She mentioned that their deployment plans include explicit outreach to first responders in each community where they plan to deploy to ensure that they have the necessary skills and capabilities to handle any potential risks.

Dr. Nealer suggested that the group should prioritize the creation of fast action memos and position statements, identify key players in different areas, and organize them into separate departments to facilitate the sharing of requirements. She noted the importance of considering the impact of different solutions on the community, public safety, and other fuels. **Kofi Wakhisi** proposed cross-referencing requirements, which was agreed upon by **Dr. Nealer** and **Charles T. Brown**, who added that the new NEVI system in Ohio could assist in collecting information in real time. The group discussed gathering data from all Title 23 stations and establishing minimum standards.

Public Comment

Colleen Quinn discussed the National EV Charging Initiative, which aims to deploy a national charging network for light and heavy-duty vehicles to meet air quality, climate, job creation, and equity goals. She encouraged participants to consider the importance of regulation in this strategy and referred to state regulations and legislation that have addressed things like reducing upfront costs and enabling utility to rate base. She also mentioned the need for demand charge reform to cut the cost of overhead costs for citing EV charging and discussed the demand side of getting consumers ready for regulations. Finally, she highlighted a Californian bill, SB 410, that requires the California Public Utility Commission to put together a shot clock on the energization timetable for energizing medium/heavy-duty industries' needs. She hoped that these regulations would be a part of the best practices of the participants' work.

Gregory Scott, a representative of the American Car Rental Association, discussed the EV fleet of the rental industry during a meeting. He mentioned that the global rental fleet has about 215,000 EVs, with 75,000 of those in the United States, which is about 1% of the overall fleet. He encouraged the Working Group to consider airports as electricity demand hubs, as 50% of rentals take place there. He also pointed out that there is no federal requirement for EVs to have an OBD2 port, which is necessary for data transmission through telematics. He commented on the importance of addressing safety concerns related to parking structures not built for EVs and working with fire chiefs to ensure safety. The American Car Rental Association plans to submit a formal statement for the record.

Rachael Sack closed the public comment period and thanked those who participated. The meeting was running ahead of schedule and Dr. Nealer gave the extra time to the subcommittees to discuss next steps.

Break 2:45-3:00

Subcommittee Recap

John Bozzella discussed various next steps related to the inventory and metrics associated with the public goods goals. The first thing they need to do is gather information from various sources about the total number of charging stations required for a given level of EV penetration. This would require some time and effort, as there is a lot of work being done on this by different organizations such as National Renewable Energy Laboratory (NREL) and California Energy Commission. The second thing they discussed was the need for a set of metrics to measure accessibility, affordability, availability, reliability, and sustainability. This would require outreach beyond the expertise of their subcommittee, and they plan to use their individual networks to define the key metrics required for defining those public goods. They will come back together soon to compare notes and finalize the metrics before the next meeting.

The conversation between **John Bozzella, Rachael Nealer, and Barak Myers** revolved around the metrics that need to be included and defined for the EV market growth rates versus charging growth rates and that delta, for the purpose of determining whether they are on track or off track. They also discussed the metrics that will determine an outcome, such as the number of charging stations and at what point they should be at in 2027, 2030, 2032, and beyond. The metrics discussed were specific to the subcommittee, but they were also found to be broadly applicable. They talked about the work done by EVs to scale, which is helpful in determining metrics. They also discussed the sustainability of the network and workforce development. **John Bozzella** raised the question of what the appropriate metric should be with regard to the cost of electricity compared to the cost of gasoline, and they planned to meet again next week to determine the next steps for grid integration.

Nadia El Mallakh stated that the grid readiness discussion revolved around two main topics - diving deeper into medium/heavy-duty vehicles and inventory. The team identified some common themes through the inventory and discussed crosscuts to look at them. For grid readiness, the team discussed capacity, EV scaling, and other areas, such as federal and non-federal studies and modeling. **Mark Dowd** agreed to push forward the inventory of federal work, and the team aimed to draft a federal and non-

federal inventory by January. The team discussed universal things to consider, such as building codes, capacity, timelines, costs, managed charging, and solutions to offset the need for specific grid infrastructures. The grid integration subcommittee is interested in defining metrics and sought input from the team on what should be in scope and how to represent them. They suggested continuing the conversation the following week and borrowing some ideas from others.

Dr. Nealer proposed starting with inventories to collect commonalities between them and suggested creating a poll to determine what inventories everyone on the committee would like to see. The group discussed identifying top priorities for fast action, such as memos or positions to consider. They also discussed serving as a coordinating team to determine which inventories fall under each subcommittee's bucket and what is reasonable for them to tackle. The group agreed that getting ideas on where to focus their attention first in the longer-term planning would help line up presentations. They also discussed creating memos for the committee chairs or making them publicly available.

Nadia El Mallakh responded that the supply chain and the need for fast action due to national security concerns were priorities. The group discussed the possibility of focusing on transformers as an example of an area that needs attention. The group agreed about the importance of comprehensive planning for the long term. They agreed that bringing all the pieces together as soon as possible and implementing best practices quickly instead of waiting for the full report is crucial. There is much work in this area, and the group believes acting sooner rather than later is essential.

Dr. Nealer acknowledged that the EVWG support team is developing operating procedures. Currently, group discussions and feedback are required before moving forward on subcommittee actions. Additionally, subcommittees can be formed for topics that people feel more strongly about. She acknowledged that the process might be different per topic. Finally, she invited feedback on whether a clear governance process is needed.

Mike Roeth discussed the plans for the next three months, which included prioritizing and defining requirements, creating position papers or statements, hold monthly meetings, and identify volunteers for each of the three tasks. **Rakesh Aneja** volunteered to work on duty cycle total cost of ownership examples to prioritize and sequence-specific things related to medium and heavy-duty trucks. They plan to study market segment case studies to identify short-term tasks to increase the adoption of electric trucks. Three members will work on each of the three tasks over the next three months to move forward.

Dr. Nealer concluded the meeting with a discussion on EVWG topics, existing resources, subcommittee best practices, and EVWG support actions by the next EVWG meeting. Presentations and meeting notes will be posted on drivelectric.gov. The next meeting is tentatively scheduled for April in Washington, D.C.

Meeting Adjourned December 13, 2023 at approximately 4:00 pm EDT.

Respectfully Submitted:
Dr. Rachael Nealer
Designated Federal Officer

I hereby certify that these meeting minutes of the December 12-13, 2023, EVWG meeting are true and correct to the best of my knowledge.