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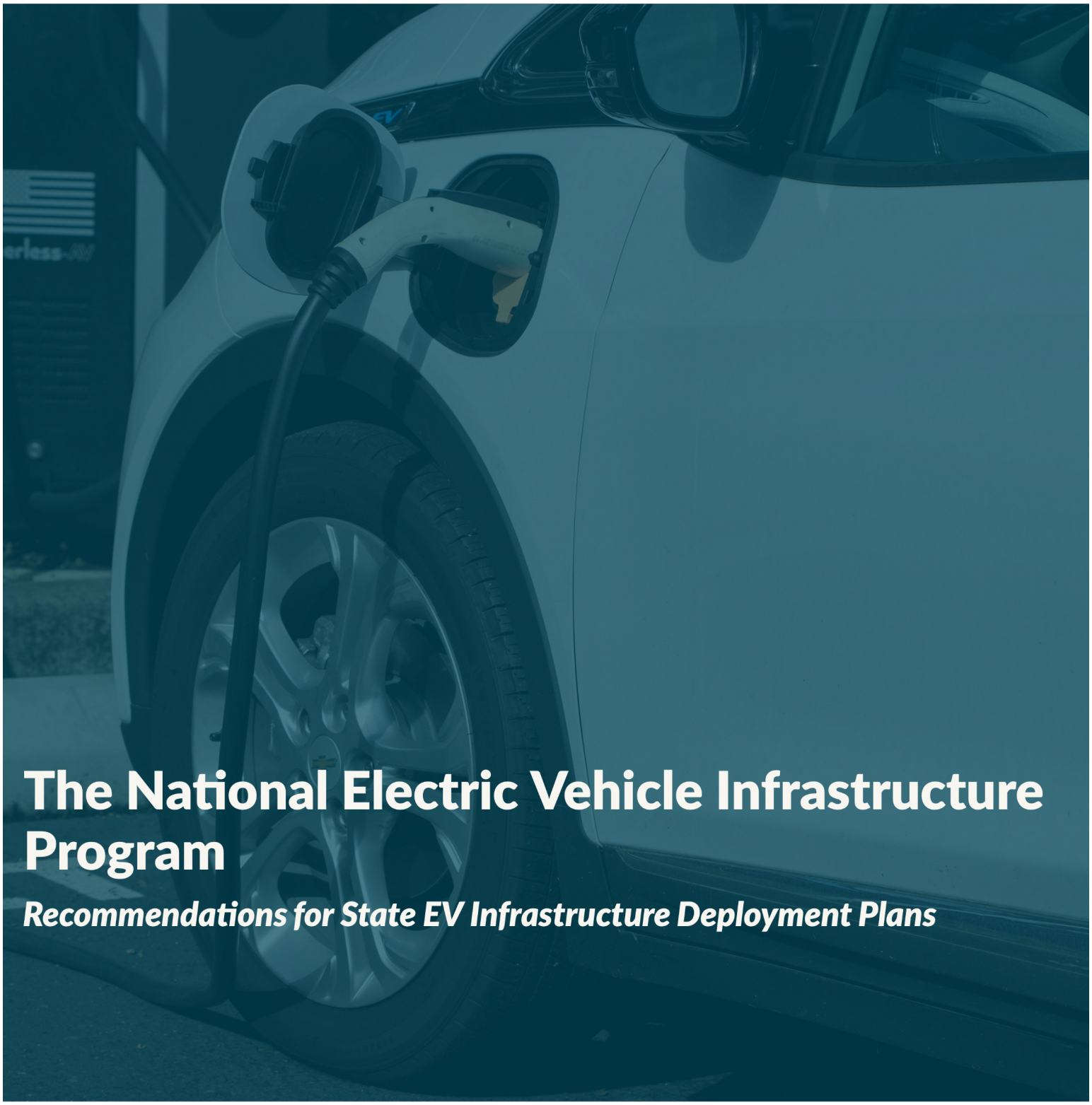

The National Electric Vehicle Infrastructure Program

Recommendations for State EV Infrastructure Deployment Plans

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Executive Summary

An Overview of Bipartisan Infrastructure Law Funding for Electric Vehicle Charging Infrastructure

The Bipartisan Infrastructure Law (BIL)—also known as the Infrastructure Investment and Jobs Act (IIJA)—provides a historic influx of federal dollars for electric vehicle (EV) charging infrastructure. Through the BIL, Congress has appropriated $7.5 billion over five years to construct a national electric vehicle (EV(charging network, in an effort to support a nationwide transition to electric vehicles. BIL funding for EV charging infrastructure consists of two programs: the National Electric Vehicle Infrastructure (NEVI) Formula Program—which is restricted to EV charging infrastructure—and the Discretionary Grant Program for Charging and Fueling Infrastructure—which may be spent on EV charging or alternative fueling infrastructure. The NEVI Formula Program allocates $5 billion from 2022 through 2026 to states—including the District of Columbia and Puerto Rico—to install publicly accessible EV charging infrastructure along designated Interstate highways, U.S. numbered highways, and state roads. The Federal Highway Administration (FHWA) has solicited nominations from state and local officials to designate Alternative Fuel Corridors (AFCs) including segments of Interstate highways and U.S. numbered highways/state roads.[1] The Discretionary Grant Program for Charging and Fueling Infrastructure will provide an additional $2.5 billion to states and other local entities—including Metropolitan Planning Organizations (MPOs) and Tribal Governments among others—to install additional EV charging and alternative fueling infrastructure along designated roadways and within communities.

This report aims to support state transportation departments to deploy NEVI Formula Program funds in ways that contribute to a robust, reliable, and nationwide network of union-made, installed, and maintained EV charging infrastructure, and maximize benefits for workers and disadvantaged communities.

Why Workers Matter for the Implementation of the National Electric Vehicle Infrastructure Formula Program

Establishing a safe and reliable nationwide network of EV chargers will require mass mobilization of, and investment in, the workers who will build, install, and maintain the EV chargers. Through deployment of NEVI Formula Program funds, states can ensure that this still-nascent technological sector is supported by workers with good wages and benefits, with access to the training they need, in safe and equitable work environments—from the manufacturing workers building the EV chargers; to the experienced electricians who will install, maintain, and operate them; to the workers who will conduct all non-electrical maintenance.

Without a concerted effort to establish and protect a reliable and skilled worker pipeline that will support EV charging infrastructure, states risk jeopardizing the quality and reliability of their NEVI-funded EV chargers, hindering the scaling up of statewide EV charging infrastructure, undermining driver confidence in the feasibility of transitioning to EVs, and forgoing significant benefits to workers and local economies.

Strengthening State Electric Vehicle Infrastructure Deployment Plans for Workers and Communities

In order to receive formula funding, each State Department of Transportation (DOT) is required by FHWA to submit to the newly-formed Joint Office of Energy and Transportation a State EV Infrastructure Deployment Plan (hereafter called a "state plan"), which will illustrate how the state will deploy its NEVI Formula Program funds.[2,3] FHWA has published program guidance and proposed rules which provide state

plan requirements, deadlines, suggestions, and guardrails delineating how states must embed labor and equity considerations into their plans in order to receive approval from the Joint Office.[4,5] FHWA guidance dictates that state plans include details on a range of factors that will impact the program's outcomes, including planned state interagency coordination, public engagement, contracting needs, existing and future EV charging needs, cyber security concerns, and program evaluation processes. The proposed rules delineate granular requirements on the installation, maintenance, and technological specifications of NEVI-funded EV charging infrastructure. State plans must be submitted by State DOTs to the Joint Office of Energy and Transportation by August 1, 2022. FHWA will then review them, and by September 30, 2022, either notify State DOTs of their plans' approval, or of the changes that must be made in order to receive approval and funding.

The federal guidance and proposed rules establish a strong foundation of labor and community protections to ensure that the NEVI Formula Program creates good jobs in the clean transportation economy and distributes economic and environmental benefits to disadvantaged communities. This report provides concrete suggestions for how states can comply with, and exceed, that strong foundation—meaning faster state plan approval by the Joint Office, and a smoother state transition to electric vehicles.

Summarized Recommendations for Equitable Implementation of the National Electric Vehicle Infrastructure Formula Program

This report's recommendations target opportunities for states to meet and exceed the federal requirements attached to NEVI Formula Program funds to maximize benefits to workers and communities, and ensure that EV charging infrastructure is installed to the utmost standards of safety and efficiency. States that build these recommendations into their state plans—and act on them in the deployment phase—will lay the groundwork for a successful and equitable transition to EVs within their state borders and nationwide.

Recommendations are divided into two categories. The first set of policy recommendations (Table 1) outlines how states can tailor their State EV Infrastructure Deployment Plans to maximize worker and community benefits during the five-year duration of the NEVI Formula Program. These recommendations, while tailored to the NEVI Formula Program, may also be applied to any federal, state, or local EV infrastructure funding.

Table 1: Policy Recommendations to Include in State EV Infrastructure Deployment Plans

Recommendation	Objective	Impact for Workers	Impact for Disadvantaged Communities	Implementation Partners
1. BUY AMERICA: Enforce domestic content requirements outlined by the Build America, Buy America (BABA) Act of the BIL; limit the use of Buy America waivers for EV charging infrastructure	- Ensure easy access to EV charging infrastructure parts and components due to a robust domestic supply chain - Reduce vulnerability of EV charging infrastructure market to global disruptions - Reduce supply chain greenhouse gas (GHG) emissions	- Promote good jobs in the domestic EV infrastructure manufacturing supply chain - Contribute to the broad geographical distribution of benefits of the transition to EVs	- Ensure benefits of vehicle electrification are broadly dispersed across geographies and communities, including manufacturing communities	- Manufacturers of parts and components for EV charging infrastructure - Industrial and manufacturing unions - Building and construction trade unions

2. **EVITP CERTIFICATION:** Require that, except apprentices, all electricians installing, maintaining, and operating NEVI-funded EV charging infrastructure are Electric Vehicle Infrastructure Training Program (EVITP)- certified	- Ensure a nationwide network of safely installed and right-sized EV charging infrastructure - Ensure equipment reliability and resiliency through training that keeps pace with technology changes over time	- Generate a skilled workforce safely installing, maintaining, and operating EV charging infrastructure - Support long-term careers in EV charging installation, maintenance, and operation	- Reduce barriers to access to Electric Vehicle Infrastructure Training Program (EVITP) for disadvantaged and underrepresented communities	- Contractors - EVITP - Utilities - State Energy Agency - Building and construction trade unions
3. **APPRENTICESHIPS:** Limit the distribution of NEVI Formula Program funds to contractors demonstrating proper utilization of Registered Apprenticeship Programs developed in coordination with labor organizations; Prioritize contractors recruiting apprentices from underrepresented and disadvantaged communities	- Promote a skilled and localized workforce pipeline to ensure safe and effective installation and maintenance of EV charging infrastructure - Provide paid, on-the-job training to future electricians who will install and maintain EV charging infrastructure	- Solidify and support collaboration between contractors and labor organizations - Increase access to career pathways and hands-on training opportunities - Increase access to EV charging infrastructure knowledge including safety protocols	- Generate localized demand for good jobs in the clean economy, particularly for workers from underrepresented and disadvantaged communities - Increase knowledge and skills of future journey-level electricians to ensure safe and effective EV charging infrastructure installation and maintenance.	- Contractors - Building and construction trade unions - State Director at the DOL Office of Apprenticeship or State Apprenticeship Agency - State Workforce Development Board - State Economic Development Agency
4. **EV CHARGING STATION MAINTENANCE:** Identify the workforce that will be responsible for non-electrical maintenance work on NEVI-funded charging stations, and require that the workers performing this role receive fair wages and benefits, sufficient training, and the free and fair choice to join a union	- Bolster public trust in the feasibility of EVs by ensuring EV charging station functionality and reliability	- Promote good jobs for workers repairing and maintaining the non-electrical components of EV charging stations	- Establish and support good-paying clean economy career pathways that do not require advanced degrees	- Contractors - State Workforce Development Board - Building and construction trade unions - Public sector unions - EV charging infrastructure maintenance training companies/organizations
5. **DEMONSTRATIONS:** Require at least one public EV charger demonstration per metropolitan area, with each demonstration including community education on EVs, EV and EV infrastructure workforce outreach, and prioritization for disadvantaged communities	- Maximize and optimize utilization of EV charging infrastructure - Minimize equipment outages by ensuring proper and safe usage of EV charging infrastructure through education - Recruit a localized workforce for installation and maintenance of EV charging infrastructure	- Expand workforce access to information on careers in the EV and EV infrastructure sectors	- Extend EV and EV infrastructure career opportunities to communities with limited EV penetration	- State Energy Agency - State Economic Development Agency - EV charging companies - Community organizations - Building and construction trade unions - Industrial and manufacturing unions - Community colleges and trade schools
6. **WORKFORCE IMPACT ASSESSMENTS:** Require workforce impact assessments from contractors receiving NEVI funds, with a focus on measuring program benefits and impacts for workers in disadvantaged communities	- Secure information needed to anticipate and mitigate potential workforce impacts of the NEVI Formula Program, and future EV charging infrastructure projects	- Direct federal spending toward contractors ensuring good wages and benefits in safe and equitable work environments - Promote procurement processes that measure and maximize benefits to workers	- Promote procurement practices that measure and maximize benefits to disadvantaged communities, such as local hire	- Contractors - State Economic Development Agency - State Workforce Development Board - EV charging companies - Building and construction

				trade unions - Industrial and manufacturing unions

The second set of recommendations (Table 2) highlights investments the state can make to support a robust EV charging workforce pipeline in the long term, with benefits to be realized throughout the duration of the NEVI Formula Program and beyond. Executing these recommendations will require coordination with multiple partners to build a resilient workforce that supports the future of clean transportation in the state and nationwide.

Table 2: Recommendations for Investments in the EV Charging Workforce Pipeline

Recommendation	Outcome	Impact for Workers	Impact for Disadvantaged Communities	Implementation Partners
7. PRE-APPRENTICESHIPS: Establish, or additionally fund, a statewide program for quality pre-apprenticeships and youth apprenticeships, and support coordination among these programs, Registered Apprenticeship Programs, local contractors, and organized labor	- Lay the groundwork for a skilled and localized workforce pipeline to ensure safe and effective installation and maintenance of EV charging infrastructure in the long term - Ensure safe and effective EV charging infrastructure installation and maintenance by increasing knowledge and skills of future EV workforce	- Connect young learners to apprenticeship programs, and eventually, careers in the EV and EV charging infrastructure sectors - Increase the size and diversity of the EV charging infrastructure workforce in the long term - Increase access to paid learning opportunities	- Increase knowledge and skills of future journey-level electricians to ensure safe and effective EV charging infrastructure installation and maintenance. - Increase access to paid learning opportunities for low-income youth	- State Director at the DOL Office of Apprenticeship or State Apprenticeship Agency - State Workforce Development Board - State Economic Development Agency - Building and construction trade unions - Industrial and manufacturing unions - School districts - Community organizations located in disadvantaged communities
8. COMMUNITY GRANTS: Provide grants for community organizations running workforce development programs that target disadvantaged communities	- Increase outreach to disadvantaged communities to meet federal Justice40 targets for infrastructure investments - Promote a skilled workforce installing EV charging infrastructure	- Increase the diversity of workforce development program participants	- Extend EV and EV infrastructure career opportunities to communities with limited EV penetration	- State Workforce Development Board - State Energy Agency - Community organizations located in disadvantaged communities - Building and construction trade unions - Industrial and manufacturing unions

Lastly, this report provides additional matters for state DOTs to consider in tandem with their NEVI Formula Program implementation efforts, to support effective, safe, and equitable EV deployment more broadly. These additional matters for consideration—including high road workforce development, coordinating with utilities, energy efficiency, and EV rideshare—are described in more detail on page 30.

The author conducted this study on behalf of BlueGreen Alliance as part of the program of professional education at the Goldman School of Public Policy at the University of California, Berkeley. This paper is submitted in partial fulfillment of the course requirements for the Master of Public Policy degree. The judgements and conclusions are solely those of the author and are not necessarily endorsed by the Goldman School of Public Policy, the University of California, or any other agency.

Key Resources for State Departments of Transportation (DOTs)

State DOTs may find additional information about the NEVI Formula Program, the BIL, and BlueGreen Alliance comments on BIL implementation at the links below.

- **Joint Office of Energy and Transportation Landing Page:** https://driveelectric.gov/
- **FHWA Guidance on NEVI Formula Program Implementation:** https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/nominations/90d_nevi_formula_program_guidance.pdf
- **FHWA Notice of Proposed Rulemaking on the NEVI Formula Program:** https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/resources/nprm_evcharging_unofficial.pdf
- **Charging Forward: A Toolkit for Planning and Funding Rural Electric Mobility Infrastructure:** https://www.transportation.gov/sites/dot.gov/files/2022-01/Charging-Forward_A-Toolkit-for-Planning-and-Funding-Rural-Electric-Mobility-Infrastructure_Feb2022.pdf
- **NEVI Formula Program State Allocations:** https://www.fhwa.dot.gov/bipartisan-infrastructure-law/evs_5year_nevi_funding_by_state.cfm
- **Alternative Fuel Corridor Designations:** https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/
- **Office of Management and Budget (OMB) Buy America Guidance:** https://www.whitehouse.gov/wp-content/uploads/2021/07/M-21-28.pdf
- **Justice40 Interim Implementation Guidance:** https://www.whitehouse.gov/wp-content/uploads/2021/07/M-21-28.pdf
- **Climate and Economic Justice Screening Tool (CEJST):** https://screeningtool.geoplatform.gov/en/#3/33.47/-97.5
- **Argonne National Laboratory JOBS EVSE 1.0 tool:** https://www.anl.gov/es/jobs-evse
- **BlueGreen Alliance BIL User Guide:** https://www.bluegreenalliance.org/userguide
- **DOT-DOL MOU on BIL Implementation:** https://www.dol.gov/sites/dolgov/files/OPA/newsreleases/2022/03/OSEC20220210.pdf
- **The Electric Vehicle Infrastructure Training Program (EVITP) Website:** https://evitp.org/

Part I: Background

This section contains research, data, and other background information related to the current U.S. landscape of EV charging infrastructure. The background section provides an overview of major issues related to constructing a nationwide EV charging network to meet the Biden administration goals of installing 500,000 EV chargers across the United States. This section also highlights the expected labor demanded—and corresponding workforce standards needed—to support installing the nationwide EV charging network. The background lays the foundational points and research to support claims in the recommendations section.

Electric Vehicle Charging Infrastructure Need

In 2021, over half a million EVs were sold in the United States, amounting to over 4% of new car sales.[6,7] EV sales in the United States are estimated to reach nearly 6 million in 2030, making up 36% of all new vehicle sales.[8] Considering the transportation sector is one of the largest sources of GHG emissions in the United States—29% of total emissions—decarbonization and electrification of the transportation sector is essential in addressing the climate crisis. In addition to making EVs more affordable, access to a robust charging infrastructure will also be needed for mass adoption of EVs.

While roughly 80% of EV charging occurs in drivers' homes, public charging is essential for those who do not have a dedicated parking spot where they can charge at home, as is the case for many urban residents, and residents of multifamily buildings.[9] Limited access to public charging adds an additional barrier for EV adoption for those not living in single family homes.[10] This is a particular barrier for lower income households that tend to live in apartments.[11] Without significant government investment in EV charging infrastructure, this barrier will slow the adoption of EVs for lower-income drivers—even as the cost of EVs declines—and hamper the transition to electric transportation nationwide.

Public charging is also essential for those traveling long distances in a single trip that exceed their EV's range, or the distance it can travel on a single charge. "Range anxiety"—drivers' concern about running out of charge due to lack of availability of charging infrastructure—is a top concern for potential EV consumers.[12] To support 2030 EV estimated growth, researchers report that the United States needs to install 900,000 more public Level 2 charging ports that get 10 to 20 miles of range per hour of charging, and 180,000 direct current fast chargers (DCFCs) that get 60 to 80 miles of range per 20 minutes of charging.[13] This is expected to require approximately $28 billion in investment from 2021 to 2030.[14]

The Bipartisan Infrastructure Law: Electric Vehicle Charging Programs

The BIL—also known as the Infrastructure and Investment Jobs Act (IIJA)—invests $7.5 billion in constructing a national EV charging network with 500,000 charging stations.[15] The BIL created the following two new programs to establish this network: the NEVI Formula Program, and the Discretionary Grant Program for Charging and Fueling Infrastructure.

The NEVI Formula Program:

- Objective: Strategically deploy EV charging infrastructure nationwide and establish an interconnected network to facilitate data collection, access, and reliability.
- Funding: $5 billion (Fiscal Years 2022-2026).
- Recipients: State governments.
- Requirements: Funded projects must be located along Alternative Fuel Corridors (AFCs), as designated by the Federal Highway Administration (FHWA).[16]

The Discretionary Grant Program for Charging and Fueling Infrastructure:

- Objective: Deploy EV charging and alternative fueling infrastructure along designated AFCs and in communities.
- Funding Level: $2.5 billion (Fiscal Years 2022-2026).
- Recipients: State and local governments, Metropolitan Planning Organizations (MPOs), Indian Tribes, and territories.
- Requirements: 50% of total program funding ($1.25 billion) is to be allocated to infrastructure on public roads and other publicly accessible locations, such as parking facilities at public buildings, schools, and parks; the remaining 50% ($1.25 billion) is to supplement charging infrastructure along AFCs.

Existing Federal Guidance on National Electric Vehicle Infrastructure Formula Program Implementation

In February 2022, the U.S. Department of Transportation (DOT) provided initial program guidance to orient grantees on the structure of the programs, including information on requirements for state plans—which state DOTs will submit to the Joint Office of Energy and Transportation and the FHWA for approval—in order to access the NEVI Formula Program funds.[17] In June 2022, the Joint Office issued a Notice of Proposed Rulemaking (NPRM) detailing standards and requirements for how States can access and expend NEVI Formula Program funds.[18] State DOTs are expected to collaborate with their state energy agencies and other key stakeholders to develop state plans that meet the requirements laid out in the program guidance and final rulemaking and submit them to the FHWA and Joint Office of Energy and Transportation no later than **August 1, 2022**. State DOTs will be notified of state plan approval, or of the changes needed for approval, by September 30, 2022. States that submit plans before the August 1 deadline will have their plans evaluated by FHWA and the Joint Office on a rolling basis.

The NEVI Formula Program Guidance includes plan requirements, deadlines, and additional tools. State plans are to include details on state agency coordination, public engagement, plan vision and goals, contracting, existing and future conditions analysis, EV charging infrastructure deployment, implementation, civil rights, equity considerations, labor and workforce considerations, cyber security, program evaluation, and discretionary exceptions.[19] The program is focused on locating charging stations along AFCs—which are a subset of interstate highway segments—to install an expansive, nationwide fast charging network, primarily for use by drivers traveling longer distances.[20] Among the requirements named in the guidance are the following:

- States must locate charging infrastructure at 50-mile intervals or less along AFCs, unless they seek an exception from the Joint Office and FHWA; and[21]

- After 2027, all EV charging stations along corridors must be DCFCs.[22]

The NPRM on the NEVI Formula Program proposes more granular requirements on the installation, maintenance, and technological specifications of NEVI-funded EV charging infrastructure.[23] The comment period for the NPRM is open until August 22, 2022. The requirements it proposes will come into effect after the comment period closes. Among the requirements proposed in the NPRM are the following:

- States must ensure that with the exception of apprentices, all electricians installing, maintaining, and operating EV charging infrastructure be certified through EVITP (see page 14 for more information on EVITP);
- For all projects requiring more than one electrician, at least one electrician should be an apprentice in a labor-management sponsored Registered Apprenticeship Program (see page 15 for more information on Registered Apprenticeship Programs); and
- Domestically produced materials and components must account for at least 55% of the total cost of NEVI-funded EV chargers, which must be manufactured in the United States (see page 13 for more information on Buy America).

The $2.5 billion Discretionary Grant Program for Charging and Fueling Infrastructure in the BIL broadens the eligible recipients list beyond states to include local governments, MPOs, Indian tribes, and territories. This will be a competitive application process—in contrast with the NEVI Formula Program—and creates the opportunity to fill gaps in the charging network that are not targeted by the NEVI Formula Program, such as community charging off of major Interstate highways. The Discretionary Grant Program for Charging and Fueling Infrastructure will be especially important in low-income and rural areas, where the funding will support chargers located in convenient and publicly-accessible places, for use by EV drivers who are not able to charge their vehicles at home, such as EV drivers living in multifamily dwellings. While the NEVI Formula Program Guidance touches upon the Discretionary Grant Program for Charging and Fueling Infrastructure, it is not the focus of that document, or this report.

Finally, though the NEVI Formula Program and the Discretionary Grant Program for Charging and Fueling Infrastructure represent historic investments in EV charging infrastructure, the U.S. DOT has also compiled additional federal funding opportunities for EV charging infrastructure. Even more funding opportunities may be offered by states, local governments, and utilities.[24]

Justice40 and Disadvantaged Communities

The Biden administration's Justice40 Initiative seeks to quantifiably and verifiably ensure that the benefits of federal investments accrue to the communities that need them most—including disadvantaged communities including low-income communities, communities with high unemployment or underemployment, communities experiencing disproportionate environmental burdens, communities that have seen significant job loss and disinvestment due to the energy transition, and more.[25] Executive Order (EO) 14008: Tackling the Climate Crisis At Home and Abroad, established the Justice40 initiative in January 2021, and required that 40% of the benefits of any climate and clean energy federal spending—including air quality benefits, economic benefits, employment benefits, and mobility benefits—flow to disadvantaged communities. [26]

Interim Implementation Guidance for the Justice40 Initiative provides additional detail on how benefits are to be measured and recorded, and greater context for what qualifies as a "disadvantaged community."[27]

The list is not exhaustive, but it is illustrative of the expansive view of disadvantaged communities that can be prioritized under BIL investments for EV charging infrastructure. In the context of the NEVI Formula Program, it is important to note that the Justice40 Initiative does not require 40% of NEVI-funded EV chargers to be placed within disadvantaged communities; it only requires that 40% of the benefits of the program flow to disadvantaged communities. This report makes recommendations about how states can comply with this requirement through the allocation of employment and economic benefits from the investment.

To assist federal agencies and grantees in the implementation of Justice40, the White House Council on Environmental Quality (CEQ) has released a beta version of a Climate and Economic Justice Screening Tool (CEJST), which uses demographic, environmental, and economic information to identify census tracts that fit the White House's criteria for disadvantaged communities.[28] A census tract is identified as disadvantaged if 1) the tract is above the threshold (90th percentile in most cases) for one or more environmental or climate indicator and/or 2) the tract is above identified thresholds for the socioeconomic indicators.

Opportunities for Low-Income and Rural Communities

EV charging infrastructure investments can help to address both climate and economic/employment crises.[29] Federal dollars from the BIL create a generational opportunity not only to support the transition to cleaner vehicles, but also to invest in local communities via new career pathways, job training, and manufacturing investments. [30] Employment in EV charging-related sectors can create economic multipliers in local communities—even those that currently have low EV penetration—inducing further job creation and facilitating economic reinvestment as wages flow back into the community.[31] Taking the appropriate planning steps to maximize and equitably distribute the employment benefits of NEVI-funded EV charging stations will be essential to ensure a successful and fair transition to EVs.

In the U.S., public EV charging infrastructure is centered in large cities and wealthy, predominantly white neighborhoods—where EV drivers are also concentrated.[32] Many low-income, Black, and Latine households are in charging deserts without access to public EV charging stations. In cities like Austin, Boston, Chicago, Denver, Houston, New York, Oakland, Orlando, San Diego, and Washington, D.C. there is less access to charging stations in Black and Hispanic majority census tracts compared to White majority tracts.[33] In California, researchers found that majority Black and Latine block groups (a subdivision of a census tract) have 0.7-times the access to public EV chargers compared to no-majority block groups.[34] The disparity is larger for publicly-funded charging stations where Black and Hispanic majority block groups are approximately half as likely as the no-majority reference group to have access.[35]

Equitably distributing stations in communities currently lacking charging infrastructure, such as rural and low-income communities, can also provide the opportunity for new local jobs. In addition

to employment opportunities directly associated with charging infrastructure, disadvantaged communities can also benefit from the general skill development needed to maintain and repair EVs.[36] EV maintenance requires a different set of skills from those needed for traditional vehicles with an internal combustion engine; installing an EV charging station looks completely different from building a gas station. Lacking charging stations in the local community limits the opportunity to work on and become familiar with the EV technology. Local residents are limited in their job growth in a booming EV industry. Communities with low incomes and high unemployment rates tend to be excluded from the benefits of EV technology and should be a focus for EV investments according to the Justice40 initiative.

Good Job Creation

The urgent need for new charging infrastructure will require massive mobilization of America's workforce to manufacture, install, and maintain charging stations. These new jobs will be represented in a range of sectors, and geographically dispersed across the United States, no matter the local level of EV adoption.[37]

Installing and maintaining a nationwide EV charging network will require various types of jobs, including manufacturers to build components for, and assemble, charging stations; electricians to install, maintain, and operate them; and workers to maintain the non-electrical components such as firmware and software pursuant to achieving 97% uptime, per the proposed requirements outlined in the NPRM.

The Argonne National Laboratory (ANL) has created the JOBS EVSE 1.0 tool to estimate the economic impacts of installing EV charging stations for states, regions, or the entire country.[38] The estimated impacts produced by the tool vary depending on user inputs, such as station type, station capacity, and equipment costs. Economic impacts can also be separated by station development and operations. Though actual impacts will vary from estimates based on particular local dynamics, states may use this tool to understand the scale of new jobs that might be created—or existing jobs that might be supported—by the NEVI Formula Program investments. This information may also inform how states approach the competitive grant process for the Discretionary Grant program for Charging and Fueling Infrastructure.

ANL researchers have used the JOBS EVSE 1.0 tool to estimate the number of jobs that will be created through the BIL investments in EV charging stations, meeting the Biden administration's goal of installing 500,000 charging stations nationwide. The assumptions input into the model largely mirror the requirements and recommendations associated with NEVI-funded EV chargers: 50 kWDCFCs, two ports per charger, two chargers per station, 12,500 stations per year, on-site electric storage, compliance with Buy America requirements, and no outsourcing.[39] The JOBS EVSE 1.0 tool projected roughly 54,000 jobs per year from station development, 1.6 jobs per year per charger in operation, and 1.1 million total jobs created over 10 years.[40]

ANL researchers also developed a sample scenario for Virginia Clean Cities, the U.S. Department of Energy (DOE)-supported state coalition for building partnerships to advance affordable energy efficient mobility systems. The Virginia scenario proposed installing 148,000 Level 2 home units;

16,881 Level 2 workplace units; and 10,733 Level 2 and 1,201 DCFC public units over approximately 10 years.[41] These goals were part of a more ambitious goal for 2040. The JOBS EVSE 1.0 tool projected that the plan would create 274,000 to 291,000 jobs in the state of Virginia associated with charging stations over 10 years. The plan showed that 40,000 jobs would be created just within the year 2030.[42]

In addition to the direct manufacturing, installation, maintenance, and administrative jobs created from the BIL EV charging investments, there are also new jobs induced by the influx of wages into communities. As more jobs become available in the community, workers spend money eating at restaurants, buying goods, and on other economic activities that create more jobs. The indirect jobs created and supported by clean transportation economy jobs like those associated with EV charging infrastructure can further enrich the communities where they are located. The induced economic activity caused by new EV charging stations, and the local jobs associated with them, is a key benefit of federal investment in EV charging infrastructure that will continue to be realized by communities where chargers are sited.

State and Local Government Authority to Apply Strong Labor Standards

States and local governments have the authority to apply strong labor standards to BIL charging infrastructure projects to ensure that they are leveraging federal dollars to build good jobs and robust workforce pipelines that will be crucial to the long-term success of the nationwide EV charging network.[43] The success of all federal infrastructure investments hinges on the workers who will build, operate, and maintain that infrastructure. States and localities should therefore work to make sure that these workers receive good wages and benefits in safe, equitable, and diverse work environments. Prevailing wage requirements are already required on the EV charging programs funded by the BIL, ensuring that the trade workers building this infrastructure are paid wages commensurate with their skills, and in line with the local average. States and localities may also make use of project labor agreements (PLAs) and community workforce/benefit agreements (CWAs/CBAs) to go above and beyond the prevailing wage requirement, which represents a bare minimum labor standard.

PLAs are agreements between workers and employers that are signed before construction begins. They control the conditions of employment of workers on specific construction projects, including wages, hours, working conditions, and dispute resolution methods. These agreements can be utilized at the state and local level to ensure high-road labor standards, a qualified workforce, and timeline projects.

CWAs are agreements between labor organizations and communities that reflect their common pledge to work together to build a high-road path to economic revitalization that includes good jobs. In addition to the collective bargaining elements of a PLA, CWAs frequently include local hire provisions, targeted hire of low-income or disadvantaged workers, and the creation of pre-apprenticeship pathways for careers on the project. A CBA is typically even more expansive than a CWA, utilizing a public participatory process to develop an agreement with the community for a broader array of benefits that may include housing and transportation priorities.

PLAs, CBAs, and CWAs can be utilized in the implementation of the NEVI Formula Program, as well as the Discretionary Grant Program for Charging and Fueling Infrastructure.[44] Their usage supports the creation of long-term, community supporting careers in the clean transportation economy.

Buy America and Domestic Manufacturing Jobs

A nationwide EV charging network will require a ramp up in U.S. capacity to manufacture the chargers themselves, and the development of a robust supply chain to meet growing demand; this represents a significant opportunity to create good-paying jobs along the EV charging infrastructure supply chain. Using the JOBS EVSE 1.0 tool, researchers estimated over 80,000 supply chain jobs could be created by 2030 in the federal scenario of manufacturing and installing 500,000 EV charging stations. These supply chain jobs include those directly involved with producing, shipping, constructing stations, and in supplying inputs to those activities.[45] The auto manufacturing industry—including its upstream supply chain—has a long legacy of high unionization rates resulting in good wages and benefits, and carving pathways to the middle class, particularly for marginalized and disadvantaged communities.[46] The EV charging infrastructure supply chain can look the same, with the right policies and guardrails in place.

One such policy is Buy America, which is a domestic content procurement preference policy that prioritizes U.S.-made materials and manufactured goods in procurement contracts for many federally assisted public infrastructure projects. Buy America aims to ensure that taxpayer dollars support domestic manufacturing jobs, not corporations that outsource production to countries with lower labor and environmental standards. Charging infrastructure is considered Buy America compliant when domestically sourced and produced components comprise 55% of the total cost of the charger, which must also be fully assembled in the United States. The BIL includes a new provision titled "Build America, Buy America," (BABA) which expands, harmonizes, and modernizes longstanding Buy America domestic content preferences to apply to more infrastructure programs and projects.[47]

Through the enforcement of Buy America requirements proposed in the NPRM, provisions to preference government procurement from employers giving their workers a free and fair choice to join a union, usage of federal funding for worker training and retraining, and reporting requirements to track workforce impacts, an onshored EV charging infrastructure supply chain can provide quality wages and benefits to thousands of workers in the United States. Global competitors are already making significant investments to lead in the production of this critical technology, on which nearly all transportation systems will soon be reliant; the United States will need to accelerate the development of its domestic EV charging infrastructure supply chain to remain internationally competitive.[48]

Need for Highly Skilled and Trained Electricians

While charging infrastructure jobs will require a larger workforce to meet the demand, a majority of the skills and training for safety planning, permitting, and installing charging stations come from the existing electrical sector. Station operation and maintenance should also be conducted by trained electrical personnel. These jobs do not require a college degree, and workers can gain the

necessary technical expertise in labor-management sponsored Registered Apprenticeship Programs.

These jobs require experience, intensive knowledge of the electrical grid, and proper training to ensure the appropriate safety measures are implemented. Large and complex projects may also require extensive preparation such as trenching new conduit lines.[49] Using skilled, trained electricians will be necessary to execute these projects safely and successfully.

According to California Workforce projections, electricians make up the largest portion of occupations needed for installing EV charging stations. For level 2 chargers, for example, 2.31 person days for electricians are needed per charger and 3.86 person days per DCFC.[50].

Electrician jobs are roughly middle-income jobs, providing opportunities for middle class households. In May 2020, the median annual wage for electricians was $56,900,[51] significantly higher than the overall U.S. median of $41,535.[52] The highest paid quartile of electricians makes at least $75,380.[53] This income premium can be largely attributable to the high unionization rate for electricians.

Becoming a union electrician mainly consists of obtaining a high school diploma and completing a 4 to 5-year Registered Apprenticeship Program. Through their apprenticeship training and by attending a trade school, union electricians typically receive 2,000 hours of paid on-the-job training as well as some technical classroom instruction. Requirements vary by state but most states also require electricians to pass a test in order to become licensed.[54]

Electrician jobs are expected to see employment growth in response to transportation and building electrification. The employment growth rate for electricians from 2020-2030 is expected to be 9%, slightly faster than the national average of 8%.[55] Industry reports attribute the shortage to an aging workforce that will retire soon and concerns about the younger generation's lack of interest in traditional trade jobs.[56] Engaging high school students, young adults, and workers from disadvantaged communities will be essential to meet the labor force needs to construct a nationwide EV charging network.

Investments and Workforce Outreach in Disadvantaged Communities

Ensuring equitable access to new technology and jobs created by EV charging stations will be necessary to combat green gentrification and displacement of current residents. Introducing new clean technology into communities may attract higher income residents in search of more environmentally friendly neighborhoods and health benefits from reduced vehicle emissions. While improving health and promoting environmentally sustainable transportation is good, new higher income residents also induce higher rents and push lower income residents out who can't afford to live in their community anymore.[57] Investment in green infrastructure should not mean displacement. But protecting existing residents, and particularly low-income residents, requires intentional local policy choices related to housing, land use, and zoning..[58]

Moreover, as new EV charging stations are built in communities, local residents should also have access to the economic benefits from the new jobs created. The installation of a new charging station represents a highly visible opportunity to engage the community in education efforts and workforce outreach. While most job searches occur online, many communities are disproportionately hindered by online job searches due to the digital divide and disparities in internet access along with computer skills. Challenges due to job postings being only available online vary among different demographics.[59] Supporting in-person workforce outreach efforts can help disadvantaged communities learn about potential jobs and can create more equitable recruitment opportunities. Additionally, teenagers and adults not actively seeking jobs can learn about other career options. Targeted recruitment in neighborhoods is also a strategy to promote local and equitable hiring practices. Outreach and education efforts related to EVs can help residents feel more comfortable with EVs to promote utilization of new technology and diversity in the workforce. State-enforced local hiring requirements and quotas can also codify the use of a local workforce in infrastructure projects like those funded through the NEVI Formula Program, ensuring that investments in neighborhoods and communities maximally benefit the people who live there.

Registered Apprenticeships, Pre-Apprenticeships, and Youth Apprenticeships

Two elements essential to creating a high road framework for quality jobs and meeting the labor need for EV charging infrastructure are: 1) expanding the career pipeline for EV related jobs, like electricians, and 2) diversifying the workforce to include members of disadvantaged communities who may be currently underrepresented in the clean transportation economy. Registered apprenticeships, quality pre-apprenticeships, and youth apprenticeships can support both elements by preparing aspiring trade and industrial workers for long-term union careers installing, maintaining, and operating charging infrastructure, and working on other clean energy projects, all of which will require skilled and trained electricians to complete. Jobs doing electrical work have historically carved paths to the middle class, while training and trade certifications provide clear career advancement structures that lead to even higher incomes for workers. Registered apprenticeships and quality pre-apprenticeship programs are the stepping stones leading to these careers; states looking to establish a reliable and diverse pipeline of workers ready to build, install, and maintain EV charging stations should support the development of these critical programs.

Registered apprenticeships are paid, on-the-job training opportunities developed by contracting companies and labor organizations and validated by the U.S. Department of Labor (DOL). In the electrical industry, electricians are considered apprentices when they are enrolled in a Registered Apprenticeship Program; once they complete 8,000 hours on the job, they are considered "journey-level" electricians. The NEVI Formula Program NPRM requires at least one apprentice electrician work on projects that require more than one electrician; this guarantees stable demand for both apprentice electricians and journey-level electricians and establishes the workforce pipeline needed to install and maintain NEVI-funded charging infrastructure.

For adults looking to build careers as journey-level electricians, quality pre-apprenticeships provide an opportunity to build the skills and baseline knowledge needed to prepare for a registered apprenticeship program, as well as the opportunity to connect with one. Quality pre-

apprenticeship programs are linked to union registered apprenticeship programs and can be particularly useful tools for diversifying the clean transportation workforce, particularly when they are embedded within disadvantaged communities and developed in partnership with local community organizations.[60] Pre-apprenticeship programs are often designed, developed, and sited with the particular intention to increase career opportunities for disadvantaged and underrepresented communities. The NEVI Formula Program NPRM specifically identifies pre-apprenticeship programs for their capacity to diversify workforces in the long term and encourages states to support inclusive programs that do outreach to women, Black, Latine, Asian American Pacific, and other underrepresented groups.

Like pre-apprenticeship programs, youth apprenticeship programs are also effective tools to bridge young people to apprenticeship programs—but are specifically tailored to high school students. These programs consist of school- and work-based learning curricula for junior and senior high school students interested in careers in the trades, such as electrical work, building, and plumbing. Students are enrolled in a youth apprenticeship course taught at their high school, while employed by a participating employer, and under the supervision of a skilled mentor. Youth apprenticeship programs require coordination from the state, school districts, high schools, employers/contractors, and other community leaders.[61] Youth apprenticeship programs are an opportunity for young people to develop job skills early and receive income. These paid employment opportunities can be especially important for youth from low-income families who need to contribute to family bills. Youth apprenticeship programs allow high school students to earn pay while building valuable skills for future employment in an exploding career pathway.

Electric Vehicle Infrastructure Training Program

EVITP is a nonprofit, brand-neutral program that trains licensed and journey-level electricians to safely install and maintain EV charging infrastructure. The approximately 20-hour course gives electricians an additional credential demonstrating their expertise in this rapidly evolving technology and assures contractors that the electricians installing and maintaining their equipment are prepared to install and maintain the vehicle fueling infrastructure of the future. EV charging infrastructure entails high voltage, underground wiring, and the fire hazard that comes with all electrical work. Installing EV charging infrastructure in older buildings with aging electrical circuitry and undersized panels can be particularly complex, and poses an even greater fire risk.[62] Poor installation of charging infrastructure can also cause irreversible damage to charging vehicle batteries.[63] NEVI-funded chargers will be visible and highly trafficked chargers that represent the Biden administration's first major investment in EV charging infrastructure. They will be key to building public trust in the feasibility of EVs, particularly in rural parts of the country. It is critical that they are installed and maintained safely and correctly and have limited down time.

EVITP is a first- and best-in-class curriculum developed in coordination with automakers, utility and energy companies, the International Brotherhood of Electrical Workers (IBEW), and other stakeholders, and has been highlighted by the Biden administration for its unique role in preparing the workforce for the transformation of the vehicle fueling sector.[64] The NEVI Formula Program guidance from the Joint Office and FHWA recommended EVITP as a credential for states to

consider for all electricians working on NEVI-funded charging infrastructure; the NPRM on the program makes that recommendation an explicit requirement.

EVITP is available in every state to licensed electricians and, in states without licensing requirements, electricians who have over 8,000 hours of hands-on electrical construction experience. EVITP certification is already required by many contractors specializing in EV charging work. The EVITP website includes a "find a contractor tool" which provides contact information for contractors who employ EVITP-certified electricians. The website also provides a certification check to verify an individual electrician's EVITP certification.

Electric Vehicle Maintenance Work

While EVITP-certified electricians will be needed for safe installation and maintenance of EV charging infrastructure, EV charging stations also require repair for non-electrical components. The NEVI Formula Program NPRM suggests that each state ensure 97% uptime for all NEVI-funded chargers, meaning that states will need to build robust systems by which to monitor and maintain EV charging systems, particularly in the case of common non-electrical issues. For example, non-electrical issues for EV chargers commonly include faulty card readers, ripped QR codes or vandalism, and software bugs. Non-electrical maintenance of EV charging stations will be essential to creating a reliable EV charging infrastructure, meeting the requirements proposed by the NPRM, and building driver trust in the completeness of the nationwide network of EV chargers. Charging station reliability and quick repair times is a major concern for EV drivers.[65] In a 2021 report from Plug-In America, 54% of surveyed EV owners reported experiencing problems with public charging, broken chargers being the most common issue.[66] At a Baltimore public utilities commission meeting, for example, residents reported that public EV charging stations have been broken and out of service for months at a time.[67] Building out a nationwide EV charging network that is trusted by drivers requires robust customer support systems, and quick response times for repairs.[68]

Part II: Policy Recommendations for National Electric Vehicle Infrastructure State Plans

The following set of recommendations details requirements for NEVI deployment that states should include as part of their NEVI state plans. They describe how states can exceed the minimum requirements laid out by the Joint Office in its NEVI guidance to ensure good jobs along the EV charging infrastructure supply chain and throughout NEVI Formula Program deployment. States can facilitate the creation of the good jobs needed to build, install, and maintain EV charging infrastructure by demanding skilled labor for NEVI-funded EV charging infrastructure projects. They can also directly support the supply of good jobs by funding EV infrastructure job training programs. The recommendations below describe policies that states can implement to promote workforce benefits through the duration of the NEVI Formula Program, which is funded from fiscal years 2022 through 2026. These recommendations may also apply to other federal grants and future programs on EV charging infrastructure and are not limited to the NEVI Formula Program.

1. Enforce Buy America Requirements for Federally Funded Electric Vehicle Charging Infrastructure

States are required to consider and address a range of factors in their state plans, including their potential to incorporate and utilize domestically manufactured EV charging infrastructure in their deployment of NEVI funds.[69] This emphasis on the use of American-made charging infrastructure is consistent with Office of Management and Budget (OMB) implementation guidance on the BIL's BABA provision, which confirmed that U.S.-made components must represent 55% of the total cost of each BIL-funded EV charger, and that final assembly must occur in the United States.[70] This emphasis is also consistent with guidance and messaging for other BIL-funded transportation programs, including the U.S. DOT's Multimodal Project Discretionary Grant Program guidance, which states that all recipients are "expected to be able to complete their project without needing a [Buy America] waiver." [71] Moreover, the Biden administration has emphasized the importance of deploying domestically manufactured EV charging infrastructure as one pathway by which federal dollars can create and protect good union jobs manufacturing the technologies of the future. It is clear that agencies and the White House alike are aligned in their efforts to establish a robust domestic supply chain for EV charging infrastructure. Strict state enforcement of Buy America requirements helps strengthen this domestic supply chain by creating reliable demand for U.S.-produced goods that will support critical transportation infrastructure, such as EV chargers, well into the future.

EV charging manufacturers are already responding to this clear messaging from the federal government by working to make their technologies Buy America compliant. Manufacturers including Tritium, FreeWire, Blink Charging, and JuiceBar have all claimed their products' compliance with Buy America policy; and the availability of Buy America compliant EV chargers will only continue to grow with increased demand. State DOTs should capitalize on this opportunity to help build a resilient domestic supply chain for EV chargers—and create good manufacturing jobs—by using their NEVI formula funds to purchase Buy America compliant EV charging infrastructure.

Beyond the significant employment benefits for the workers who will build the technology, and the economic benefits to the communities where chargers are built, establishing a robust domestic supply chain for EV chargers reduces U.S. vulnerability to global supply chain disruptions; by buying U.S.-made chargers, states will be able to secure the charging infrastructure they need quickly and reliably, to their particular needs and specifications. The COVID-19 pandemic's catastrophic impact on globalized supply chains has made the benefits of localized supply chains starkly clear.[72] Strengthening EV charger domestic supply chains can increase the reliability and speed of obtaining parts needed for EV charging station installations and repairs. By obtaining important EV charging infrastructure domestically, EV charging station installers can rely on U.S. manufacturers to produce necessary parts and components for repairs and maintenance.

Recommendation: Enforce domestic content requirements outlined by the BABA, and limit the use of Buy America waivers for EV charging infrastructure.

2. Require Electric Vehicle Infrastructure Training Program Certification for All Electricians Installing, Maintaining, and Operating EV Chargers

EVITP builds on the existing knowledge of experienced electricians and trains them to safely install and maintain EV charging infrastructure.[73] As discussed in Part I of this report, the NEVI Formula Program guidance initially named EVITP as a recommended credential for states to consider including in their NEVI Formula Program state plans; the NPRM makes that recommendation an explicit requirement. States are encouraged to include in their state plans a requirement for EVITP certification for all electricians installing, maintaining, and operating the electrical components of NEVI-funded EV charging infrastructure. By requiring the use of EVITP-certified electricians, states can ensure that a qualified workforce is installing and maintaining critical transportation infrastructure that more and more drivers will rely on for their mobility needs, and that NEVI funds are promoting quality, high-skill jobs.

EVITP is the only training program supported by automakers, unions, utilities, and the EV charging industry to provide the necessary knowledge to safely install EV charging infrastructure. It is a brand-neutral, non-profit organization that uses registration fees to cover the costs of running the training. The program is readily available to all licensed electricians, or electricians with over 8,000 hours of experience, in all 50 states. The fee to participate in the program is $275 per person—a cost often absorbed by the contractors who themselves require the training—and entails 18-20 hours of coursework and a final exam. In California, where the training program is already required for electricians installing state-funded infrastructure, EVITP is available asynchronously online.[74] By prioritizing safe installation and creating a demand for EVITP certified electricians, California's state requirement has made it feasible for EVITP to offer the training online, further increasing accessibility for electricians across the state.

The staff at EVITP have the capacity to expand EVITP training, including the online component, to other states, but have only done so in California due to the state requirement. States wishing to expand access to EVITP training should adhere to the proposed requirement for EVITP certification.

Creating the demand and opportunity for online EVITP training can help reduce barriers to obtaining the training. For example, electricians living in more remote rural areas may face financial and logistical barriers to attending in-person training, such as untenable commute times, lodging expenses, and childcare needs. The online version of the curriculum can help overcome these barriers, and may also benefit electricians with tight schedules who need to complete the training outside traditional work hours. States' requirements for EVITP certified electricians can trigger the stable demand needed to justify expanding access to training.

States can also conduct community outreach efforts to educate electricians on the availability and benefits of EVITP. For example, in California, the San Diego Association of Governments (SANDAG) and the Center for Sustainable Energy (CSE) hosted a webinar on EVITP for electricians, ahead of the announcement that California would be requiring EVITP certification for electricians working on state-funded chargers.[75] State energy offices and utilities can duplicate these outreach efforts by collaborating with labor unions to educate licensed and journeyperson electricians on EVITP.

Recommendation: Require that, except apprentices, all electricians installing, maintaining and operating the electrical components of NEVI-funded EV charging stations are EVITP-certified.

3. Require Registered Apprenticeship Work Hours

State DOTs have the authority to ensure and require that contractors deploying NEVI Formula Program funds make proper utilization of apprentice electricians. Usage of apprentices is strongly encouraged by the Joint Office; the NEVI Formula Program NPRM proposes a requirement that for all projects requiring more than one electrician, at least one be an apprentice participating in a Registered Apprenticeship Program. Registered Apprenticeship Programs are typically developed through the partnership of a contractor and a labor organization. They provide paid on-the-job training to aspiring licensed or "journey-level" electricians, and ensure a reliable pipeline of trained workers who will be ready to service the critical transportation infrastructure of the future.[76] Many contractors installing and maintaining EV charging infrastructure already benefit significantly from Registered Apprenticeship Programs; they provide reliable pipelines of skilled local workers, which contractors draw upon for their projects. In order to maximize recruitment of a diverse workforce, state DOTs may look to state workforce development boards for help identifying and evaluating apprenticeship programs along a range of metrics, including program recruitment efforts in underrepresented and disadvantaged communities.

Apprenticeships provide electricians with the hands-on experience needed to effectively and safely perform their jobs—all under the guidance of one or more experienced electricians. Without a specific effort to develop and support strong apprenticeship programs, states are more vulnerable to workforce shortages; Registered Apprenticeship Programs serve to mitigate the numerous risk factors associated with skilled craft labor shortages in the immediate and long terms, which helps ensure that EV drivers have reliable, frequent, and continuous access to EV charging infrastructure no matter where they are driving.

Moreover, the proper utilization of Registered Apprenticeship Programs can support diversity in the EV workforce. One study found that over half of surveyed EV industry stakeholders in California highlighted access to apprenticeship and training as an important pathway by which high quality EV infrastructure jobs could be created in priority communities. Many also noted that collaborating with unions to develop these training pathways supported having a diverse trained workforce to support new EV charging infrastructure.[77] Communities see stronger job growth from investments in local and customized job training programs.[78]

The NEVI Formula Program provides an opportunity for states to build up localized workforces that will be ready to service the EV charging infrastructure funded by the program, as well as all the future EV charging infrastructure that will be needed as more drivers and fleets adopt EVs. By directing program funding to contractors who are making proper utilization of Registered Apprenticeship Programs, states help ensure that the employment benefits from the NEVI Formula Program are reaching local workforces and disadvantaged communities that are often targeted for recruitment by registered apprenticeship programs.

States that require proper utilization of apprentices have already begun to realize the long-term benefits of such commitments to diverse and unionized workforces.

- In Spokane, Washington, 15% of labor hours on public works projects costing over $600,000 need to be completed by apprentices, and 10% of apprentices should be veterans, women, minorities, and residents of empowerment communities the city has identified. The 15% apprentice utilization requirement also applies to subgrantees of over $100,000.[79]
- In California, the apprentice utilization rate for such projects is 20 %.[80] Public works projects in Los Angeles require that 50% of apprentice hours are completed by local residents. The city has also identified target zip codes with lower median incomes and higher unemployment rates for local hires.[81]
- The Construction Career Pathways Project in Oregon also recommends a minimum of 20% of total work hours in each apprenticeable trade shall be performed by state registered apprentices.[82]

Recommendation: Limit the distribution of NEVI Formula Program funds to contractors demonstrating proper utilization of labor-management sponsored Registered Apprenticeship Programs developed in coordination with labor organizations. Prioritize contractors recruiting apprentices from underrepresented and disadvantaged communities as identified by CEJST and supported by the Justice40 initiative.

4. Require Non-Electrical Maintenance Workforce For EV Charging Stations

Installing a robust and reliable EV charging network will require timely maintenance and repairs of EV charging stations—not only for electrical issues but also for software issues and physical damage that limit drivers' ability to use the chargers. States should hold contractors installing EV charging stations with NEVI Formula Program funds accountable to monitoring and frequent maintenance of stations, and should ensure that the professionals performing non-electrical

maintenance work receive good wages and benefits and sufficient training. The NPRM proposes a required minimum of 97% uptime for NEVI-funded chargers, meaning that chargers are operational 97% of the time. This is only possible through the development of a trained and localized non-electrical maintenance workforce.

EV charging station reliability is a significant concern for drivers considering buying an electric vehicle, particularly for long-distance travel. EV drivers are often confronted with broken EV charging stations and struggle to find stations that work properly.[83] States must include in their State Plans a strategy to ensure timely repairs, and work to minimize outages. Some issues do not require an electrician for their resolution but *do* require immediate attention from a professional who is familiar with the technology and software. State DOTs should identify the entity responsible for this non-electrical maintenance work over the lifetime of the charging stations – whether the DOT itself, the charging station manufacturer, or a third party – and ensure that the workers performing this maintenance receive fair wages and benefits, sufficient training, and the free and fair choice to join a union.

Having professionals on call for critical non-electrical troubleshooting work can reduce the wait time for an EV charging station to be repaired by an electrician, and reduce the overall downtime of EV chargers. Good jobs and robust maintenance systems will continue to be critical well into the future, as more EV charging stations are built under the NEVI Formula Program, and beyond.

Recommendation: Identify the workforce that will be responsible for non-electrical maintenance work on NEVI-funded charging stations and require that the workers performing this role receive fair wages and benefits, sufficient training, and the free and fair choice to join a union.

5. Provide Demonstrations: Community Education and Workforce Outreach

EV charging stations funded by the NEVI Formula Program may represent many communities' first experiences with EV charging infrastructure, particularly in low-income and rural regions with limited EV penetration.[84] This makes community education and workforce outreach of utmost importance to ensure that states are maximizing public awareness of the availability of EV chargers, and seeding a localized workforce for the installation and maintenance of those chargers. States should provide demonstrations—including community education and workforce outreach—for EV charging stations funded by the NEVI Formula Program.

Demonstration events can be a place to showcase employment and workforce development opportunities. For example, New York City is working with community partners to offer free introductory training on EV charging stations. This training does not replace Registered Apprenticeship Programs or EVITP, but is an introduction to EV charging stations and can expose residents to career options working on EV charging infrastructure.[85] There are a wide range of jobs that community members can work in that support EV charging infrastructure and the state should support efforts to train a diverse skilled workforce. Training programs such as these can also be included as part of EV demonstration events.

Demonstrations are particularly important in rural communities and small towns where residents have limited exposure to EV charging infrastructure.[86] For example, Minot in North Dakota is an Air Force Base city with a population of roughly 48,000 and the Verendrye Electric Cooperative and Enerbase installed a new charging station and held a EV demonstration showing how to charge the vehicle. Verendyre owns EVs dedicated to education efforts. A manager from Verendrye highlighted the importance of educating about new technology and the important role cooperatives have in teaching the community. Electric cooperatives are in a unique position to provide community education efforts. Prior to the COVID-19 pandemic, other cities across the country have also used education events to raise awareness around EVs.[87]

Many local governments are leveraging partnerships with EV charging companies to provide EV charging demonstrations at events. For example, the Colorado DOT, under the Office of Innovative Mobility, hosted an Electric Vehicle Ride and Drive community event at a Pre-Owned Electric and Hybrid Vehicle Dealership.[88]

As new EV charging stations are placed in disadvantaged areas, the inclusion of information on jobs installing and maintaining EV charging infrastructure can support the development of a diverse workforce. [89] Ensuring employment benefits accrue to disadvantaged communities, especially through local hiring requirements and quotas, will help State Plans meet Justice40 requirements as well.

As new EV charging stations are entering communities, states should host at least one demonstration per metropolitan area and possibly more depending on the size of the community and distance from other EV charging stations. States should also prioritize holding demonstrations in low income and rural communities to promote EV adoption and job opportunities to disadvantaged groups. An effective demonstration will include partnering with local community organizations to spread awareness and with labor unions and community college/trade schools to share workforce opportunities. State energy offices can also collaborate with EV charging station companies to provide education efforts. Including EV charging demonstrations with workforce outreach allows for new EV charging projects to have a bigger impact on the local community. Especially in disadvantaged communities, it is important to maximize funds by addressing multiple issues at once.

Recommendation: Fund at least one public EV charger demonstration per metropolitan area. Demonstrations must include community education, workforce outreach, and prioritize disadvantaged communities as identified by the CEJST or a state-level environmental justice community mapping tool.

6. Require Workforce Impact Assessments

Procurement requirements represent one of the main policy levers states may creatively utilize to both ensure successful implementation of the NEVI Formula Program and track its workforce and economic impacts over time. Given the significant potential workforce impact of the NEVI Formula Program, states should require contractors profiting from program funds to provide robust longitudinal workforce information on number of jobs, quality of jobs, wages and benefits,

union status, utilization of training and Registered Apprenticeship Programs, diverse hiring practices, and more. By requiring all contractors to report workforce information, states can make more informed assessments in selecting contractors according to their projected impact on the local workforce and economy. State workforce development boards may collaborate with labor unions to ensure workforce impact assessments accurately capture workforce concerns. Workforce impact assessments may particularly support state efforts to fulfill the Justice40 Initiative requirements, which dictate that 40% of the benefits from the program accrue to disadvantaged communities. This requirement can be fulfilled by demonstrating that the jobs supported and created by the NEVI funds are held by workers from disadvantaged communities.

Jobs to Move America, a non-profit organization dedicated to leveraging public dollars to support a better future for workers, has created a framework called the U.S. Employment Plan (USEP), a customizable, federally approved policy tool that builds worker protection, good job creation, and equity into the fabric of the public purchasing process. Cities, states, and public agencies can incorporate USEP into their purchasing processes—such as those they'll use to select contractors to execute their state plans—to: 1) solicit descriptive proposals from contractors that include information on projected job and employment impacts; 2) evaluate or score contractors according to the quality of their proposals; and 3) ensure contractor transparency and accountability to their commitments as funds are actually disbursed. Rather than just submitting information about traditional factors like technical specifications and price, the USEP requires the companies competing for public contracts to disclose the number, type, and location of jobs the contract will create and retain, as well as salaries, benefits, training programs, and their plan to recruit and train historically marginalized workers.

Originally developed to ensure good jobs in manufacturing—and particularly manufacturing transportation infrastructure purchased by public entities—USEP may also prove a valuable tool for states seeking contractors to install, maintain, and operate the electrical and non-electrical components of NEVI-funded EV charging infrastructure. The framework is proven to incentivize manufacturers bidding for public contracts to commit to creating good jobs, invest in new manufacturing facilities in communities, and generate career pathways for people traditionally left out of the manufacturing sector, including women, people of color, veterans, and formerly incarcerated people; the same can happen for the workers impacted by the NEVI Formula Program.[90]

The following is a compilation of sample questions to include in Requests for Funding Proposals (RFPs) that prioritize workforce development.[91]

Example RFP Questions:

- Has your project secured a CBA or PLA?
- Please describe any CBA or PLA your project has secured or will secure.
- Does your project ensure that all workers manufacturing, installing, maintaining, and operating the charging equipment have a free and fair choice to join a union?
- Will your workforce be paid a prevailing hourly wage rate?
- Please describe the new jobs being created by your project.

- Please describe the share of your workforce that includes apprentices or skilled journeypersons, veterans, and residents of disadvantaged communities as determined by the Justice40 initiative.
- Will the project be built and maintained under a Responsible Contractor Policy that includes affirmative performance, labor, environmental, and safety standards along with transparency and whistleblower protections?[92]
- Will jobs created by the project offer pay, benefits, and career opportunities consistent with area standards for conventional internal combustion engine (ICE) vehicle jobs?
- Will the developer and Engineering, Procurement, and Construction (EPC) contractor partner with Registered Apprenticeship Programs to train and employ workers who work in conventional energy and/or come from environmental justice communities?
- Will the developer and Engineering, Procurement, and Construction (EPC) contractor work with local stakeholders, including labor unions, to maximize use of the local workforce to build and maintain the project?

Recommendation: Require workforce impact assessments of contractors seeking NEVI Formula Program funds, with a focus on measuring workforce impacts for workers from disadvantaged communities.

Part III: Recommendations for Long-Term Investments in the Electric Vehicle Charging Workforce Pipeline

This section presents a set of recommendations to support a diverse and skilled workforce to install, maintain, and operate EV charging infrastructure. Developing a strong workforce pipeline will be essential for the long-term success of EVs and other clean energy technologies. States can help address the issue of creating good jobs from the supply side by supporting efforts for training and increasing workers' skills. Investing in labor-management sponsored Registered Apprenticeship Programs and other workforce training programs will provide workers with the proper skillset to safely, accurately, and efficiently construct EV charging infrastructure in the future. These investments will also expand access to workforce training to increase the diversity of workers benefiting from EV charging infrastructure jobs. While these recommendations are focused on supporting EV charging infrastructure jobs, many of the following investments will support a wide range of jobs in the electrical and clean energy sector. For example, investments to support apprentice electricians may not only bolster the pipeline of workers with the skills to install, operate, and maintain EV charging stations, but also the pipeline of transmission workers, workers in the energy efficiency sector, and other key clean economy sectors. These investments will have longer term impacts on the overall clean economy workforce as the country transitions to a cleaner transportation system.

7. Fund Statewide Pre-Apprenticeship and Youth Apprenticeship Programs

States should create programs dedicated to establishing and funding youth apprenticeship and pre-apprenticeship programs. These programs should also work closely with EV charging companies to encourage mentorship and sponsorship of program participants. States may also consider funding state and local intermediary organizations to coordinate significant expansion of paid work experience opportunities aligned to postsecondary education and training pathways.[93]

Pre-apprenticeship programs—in particular—are a key tool for improving diversity in the building trades. Such programs aim to ensure that workers can qualify for labor-management sponsored Registered Apprenticeship Programs and are equipped with the skills and knowledge they need to succeed in their long-term career. Pre-apprenticeship programs can be tailored to recruit participants from certain demographics such as low-income people, people of color, women, and other marginalized communities that have been historically underrepresented in the trades. The most successful pre-apprenticeship programs are those affiliated with labor-management sponsored Registered Apprenticeship Programs, because they put early career workers on a clear pathway to a successful union career in the trades. Wraparound services such as transportation and childcare can also be provided to participants in pre-apprenticeship programs to support recruitment and retention of underrepresented and disadvantaged workers.

The Wisconsin Department of Workforce Development (DWD) has been operating youth apprenticeship programs since 1991 and prepared more than 38,000 students for careers and post-secondary training.[94] DWD has established 11 youth apprenticeship career programs in areas including: agriculture, food and natural resources; architecture and construction; transportation, distribution and logistics; manufacturing and others. The

architecture and construction career pathway provides students with knowledge and skills related to jobs needed for EV charging infrastructure such as electricians, electrical engineers, and regional planners. [95] Over 3,100 employers and 4,300 youth apprentices across Wisconsin participated in the youth apprenticeship program during the 2017-2018 school year. Employers extend permanent job offers to more than 75% of the graduating youth apprentices annually.[96] States may use Wisconsin's youth apprenticeship program as a model for building a foundation for a robust pipeline of workers ready to meet the demand for professionals in the EV infrastructure sector.

Recommendation: Establish, or additionally fund, a statewide program for quality pre-apprenticeships and youth apprenticeships, and support coordination among these programs, labor-management sponsored Registered Apprenticeship Programs, local contractors, and organized labor.

8. Grants for Community Partners Diversifying Apprenticeships and Job Pipelines

Strategic partnerships are essential in outreach for job and workforce development opportunities. State should provide grants to community organizations and workforce development groups who can lead outreach efforts and recruit diverse communities into quality pre-apprenticeship and labor-management sponsored Registered Apprenticeship Programs and other employment/career development opportunities. Community based organizations (CBOs) can assist with targeted outreach based on their organizations' particular foci and missions. State agencies should offer a simple application process for relevant CBOs. Diverse community organizations such as local charities, youth organizations, housing authorities, and religious groups that are established in the community can be supported to do outreach.[97] By being embedded in the community, organizations can leverage their trust to involve future workers in the quality training programs described in prior recommendations.[98]

Organizations receiving funds should demonstrate expertise and experience working with and in disadvantaged communities identified by the CEJST. For example, demonstrating expertise working in disadvantaged communities can include being located directly in the disadvantaged community or having staff who speak diverse languages relevant for residents. Organizations should also demonstrate having connections to established community groups such as neighborhood coalitions and youth programs. Having a history of community engagement in disadvantaged communities will be essential to build off previous relationships and promote workforce development programs. Organizations that can demonstrate a history of workforce development are also good candidates for grants. In addition to establishing solicitation criteria that prioritizes organizations that can be successful working in disadvantaged communities, the solicitation application process should also be simple and accessible for CBO's to apply.

Grants for CBOs and other stakeholders can support workforce development efforts to recruit and train workers to construct EV charging stations under the NEVI Formula Program. Dedicated funds and efforts towards targeted outreach and recruitment can help Registered Apprenticeship Programs and other workforce development programs more effectively reach disadvantaged workers and support the success of investments in training. Organizations currently working with

disadvantaged communities are on the ground and can provide resources about training programs and career pathways in EV charging infrastructure directly to residents. Funding organizations to expand career pipelines can promote equitable outcomes in diversifying the workforce and ensuring the economic benefits of EV charging infrastructure reach disadvantaged communities as detailed in the Justice40 Initiative.

Denver, Colorado recently awarded $2.1 million to six grantees focused on providing career pathways to the clean energy industry. The Denver Office of Climate Action, Sustainability and Resiliency (CASR), in partnership with the Denver Office of Economic Development and Opportunity (DEDO), published a Request for Funding to fund one or more projects between $50,000 and $450,000 each.[99] The grant recipients will provide outreach, education, up-skilling, re-skilling, pre-apprenticeships, registered apprenticeships, and on-the-job training. The aim is for awardees to also reduce or eliminate barriers to employment for people from under-resourced communities, people of color, and workers from industries in transition, such as the oil and gas industry.[100]

The CaliforniansForAll Youth Workforce Program also recently closed a Request for Funding for counties and small to medium cities (population under 300,000) to fund youth employment programs. The focus of the program is to expand youth interest in and experience towards a career, and to strengthen city capacity to address key areas such as climate. While only counties and cities are eligible to apply, applicants are encouraged to include CBOs as subgrantees to focus on relevant project elements, such as those with existing workforce development programs.[101]

Recommendation: Provide grants for community organizations running workforce development programs that target disadvantaged communities.

Part IV: Other Considerations for Effective, Safe, and Equitable EV Deployment

High-Road Workforce Development

With the influx of federal BIL funding and the urgent need for new infrastructure, there is an opportunity to establish "high road" standards for EV related jobs. Prioritizing quality job creation as part of charging infrastructure deployment can provide career pathways for disadvantaged workers and meet increased labor needs to install EV charging stations. Various organizations, companies, and governments are taking a high road approach to workforce development.

A high-road workforce development has two objectives:
1) improve the quality of jobs so that they are better able to support workers' economic self-sufficiency, upward mobility, and overall welfare; and
2) increase access to jobs for people who need them most and who have been historically excluded from career track, family-sustaining employment.[102]

Researchers from the University of California Berkeley Labor Center have produced a guide on high road strategies for climate action.[103]

Workforce Development Boards

The Better Training and Better Jobs report from the Center for American Progress (CAP) highlights strategies to expand workforce development. Key recommendations include expanding the representation of labor organizations on state and local workforce development boards to provide a stronger worker voice. The recommended model for representation is "one-third of board members are employers, one-third represent workers, and one-third represent other stakeholders, including elected officials, education and training organizations, and community development organizations." Creating equal ratios of represented groups can mitigate the dominance and influence of one group over the entire board. This ratio was developed after assessing that while the Workforce Innovation and Opportunity Act (WIOA) of 2014 requires 20% labor representation, there is still opportunity for the employer voice to have the most power on workforce development boards. The focus on expanding worker voice in workforce development boards is to advance worker needs while also convening with employer representatives to ensure training appropriately serves job opportunities. A more evenly represented board creates opportunities for true partnership.[104]

As states are implementing the NEVI Formula Program and installing EV charging infrastructure, worker voice at the state level will be essential to ensuring workforce development efforts are serving workers as they are on the frontline constructing the charging stations. The worker voice is needed for feedback if trainings are effective and helpful for performing job tasks. Quality and effective training can help workers develop the proper skillset to safely and correctly install EV infrastructure. Workers can also provide insight on recruitment efforts and opportunities to expand outreach to more diverse groups. This will be essential to advancing equity benefits of economic development spurred by new EV charging infrastructure. Lastly, more adequate worker

voice representations on workforce boards will help workers advocate for worker protections and compensation. In implementing a new program like NEVI, workforce development boards can provide the state with the needed insight to adapt policies to support its workforce and meet the need for EV charging infrastructure.

Coordinating with Utilities for Grid Reliability in Rural Communities

Installing more public EV charging stations, especially fast chargers, will increase demand on the electrical grid.[105] The Department of Transportation highlights how this is especially pertinent for rural areas where grid infrastructure may be less robust.[106] As states and localities receive federal funds from the NEVI Formula Program to construct charging stations along major highways, rural communities will be faced with adapting to new demands on the electrical grid. Upgrades to the electrical grid, greater energy efficiency, and overall grid planning will be essential to ensuring the success for a nationwide EV charging infrastructure.

Coordinating with utilities companies to plan for EV charging stations will be crucial for rural communities. While the EV charging installers can make some on-site modifications to electrical equipment, they may need to coordinate with the local electric utility for major infrastructure upgrades. Early coordination with utilities will ease the permitting process and avoid additional costs.

Energy Efficiency Jobs

In addition to expanding an electrician workforce to install charging stations, electricians and other trained workers will also be needed to strengthen grid infrastructure and energy efficiency programs. Energy efficiency projects will be essential to reducing the demand on the electrical grid and can translate to energy savings on electrical bills for customers. This will be vital for rural communities that may have aging electrical infrastructure and stations built in more remote areas along major highways.[107] Potential site hosts interested in constricting a charging station can also benefit from cost savings on their electricity bill from energy efficiency upgrades.[108]

The American Council for an Energy-Efficient Economy (ACEEE), recently wrote a report on strategies to increase equity and workforce strategies for energy efficiency. A major takeaway is that state agencies should work with utilities companies to develop and expand workforce development and training programs. Trainings should be designed to meet the needs of utilities companies, especially in regards to electrical updates for EV charging stations and other renewable energy projects. Energy efficiency and renewable energy can also be incorporated into existing skills training programs.[109] Expanding opportunities for energy efficiency jobs can provide growing career opportunities in a variety of industries.[110] ACEEE has also compiled a list of city Energy Efficiency and Renewable Energy Workforce Development programs.[111]

EV Carshare/Rideshare and Workforce Programs

In addition to lacking EV charging infrastructure, disadvantaged communities face multiple transportation challenges. Carshare and ride sharing programs, along with micro mobility, are springing up all over the country to address the dual issue of minimal EV infrastructure and limited transportation options.

Carshare programs are helpful for communities where vehicle ownership is low and can expand transportation options. Electrifying the shared fleet also builds comfort with EVs and can bring charging infrastructure to areas where EV use is still low. EV adoption is slower in the low-income communities who do not have the funds to buy a new car and are worried about where to charge an EV. Incorporating car sharing into new charging stations promotes utilization, especially where EV adoption is still limited. Cities have begun placing charging stations with carshare programs near multi-unit and affordable housing. For example, the city of Hood River, Oregon (population 8,000) is piloting a carsharing program for a small town.[112] A housing project in San Pedro, California has also brought car share to help residents have affordable access to a vehicle. Residents do not have to worry about purchasing their own insurance and other vehicle costs when using the EV carshare as it's included in the rental fee.[113]

A new carshare and e-mobility program in Stockton, California—Stockton Mobility Collective—is also incorporating a workforce development apprenticeship program to provide full-time jobs and training to support the e-carsharing and e-bikeshare projects.[114] EV carshare programs incorporated into new charging infrastructure can advance equity and make EV use a reality for disadvantaged communities. Including car and/or ridesharing programs with charging infrastructure can help introduce EVs to disadvantaged communities and bring additional workforce opportunities.

Rural communities are already familiar with on demand service such as dialing for a ride.[115] In Central Virginia, JAUNT is a public transit system providing a rideshare program to seven counties in the region, four of which are rural. JAUNT provides rides to work, healthcare appointments, recreational activities, and other destinations. JAUNT currently operates 85 vehicles and uses federal, state, and local funds to supplement fares received from riders.[116] Another example is the city of Huron, California, which is incorporating electric vehicles into an on-demand rideshare program called Green Raiteros.[117] Residents are able to set up rides to medical appointments and vanpool for work. Huron is a small rural agricultural town in Central California with a population around 6,000 made up of predominantly immigrant and Spanish-speaking farm workers.[118] The rideshare program is able to introduce electric vehicles to the community, expand transportation options, and reduce greenhouse gas emissions.

Conclusion

The BIL provides a historic influx of federal dollars for EV charging infrastructure. Meeting the Biden administration's goal of installing 500,000 EV charging stations will help electrify the transportation sector to fight climate change and improve local air quality; but paired with the right policies and strategic implementation, it should also create opportunities for good jobs. Establishing a safe and reliable nationwide network of EV chargers will require mass mobilization of, and investment in, the workers who will build, install, and maintain the EV chargers. With federal funds allocated from the NEVI Formula Program, states have a unique opportunity to fund new green technology in communities but also ensure a skilled and localized workforce for the safe and effective construction of EV charging infrastructure.

With NEVI State EV Infrastructure Deployment Plans due this summer, states will need to act quickly to identify strategies to support workers in installing EV charging infrastructure. The recommendations in this report support state transportation departments in their deployment of NEVI Formula Program funds in ways that both contribute to a robust and reliable nationwide network of EV charging infrastructure and maximize benefits for impacted workers and disadvantaged communities. Through deployment of NEVI Formula Program funds, states can support workers with good wages and benefits, access to the training they need, and in safe and equitable work environments—from the manufacturing workers building the EV chargers, to the licensed electricians who will install, maintain, and operate them, to the non-electrician professionals who will service them to ensure maximum uptime.

By prioritizing disadvantaged communities, states can promote the benefits of federal dollars reaching those historically underserved and meet Justice40 equity goals. Without concerted effort to establish and protect a reliable and skilled worker pipeline that will support EV charging infrastructure, states will jeopardize the quality and reliability of their NEVI-funded EV chargers, undermine driver confidence in the feasibility of transitioning to EVs, and forgo significant benefits to workers and local economies. Taking these steps to support workers and disadvantaged communities will help ensure a more equitable expansion of EV infrastructure as states aim to curb climate change.

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