SITING ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE) WITH EQUITY IN MIND

BY PETER HUETHER

ACEEE WHITE PAPER
APRIL 2021

ACEEE
American Council for an Energy-Efficient Economy

Contents

About the Author

Peter Huether conducts research and analysis for the transportation program at ACEEE with a focus on light-duty fuel efficiency and electric vehicles. He works on promoting equitable access to electric vehicles and leads the annual life-cycle emissions analysis of light-duty vehicles for ACEEE's Greenercars.org. Peter holds a master of science in public policy and management from the Heinz College at Carnegie Mellon University and a bachelor of arts in economics and global environmental change and sustainability from Johns Hopkins University.

Acknowledgments

This report was made possible through the generous support of the New York State Energy Research and Development Authority (NYSERDA) and the Los Angeles Department of Water and Power (LADWP). The author gratefully acknowledges the external reviewers, internal reviewers, colleagues, and sponsors who supported this report. External expert reviewers included Kianiwai Jones from LADWP, Jason Zimbler from NYSERDA, Samantha Houston from the Union of Concerned Scientists (UCS), Maddie Koewler and Cassie Powers from the National Association of State Energy Officials (NASEO), and Miles Muller from the Natural Resources Defense Council (NRDC). External review and support do not imply affiliation or endorsement. Internal reviewers included Rachel Gold, Steve Nadel, Lauren Ross, Mike Specian, and Shruti Vaidyanathan. The author also gratefully acknowledges the assistance and input of Conner Smith and Nicole Lepre from Atlas Public Policy, Mark Siegal from National Grid, Mackenzie Martin from Puget Sound Energy, and Victor Couto from Seattle City Light. Last, we would like to thank Mariel Wolfson for developmental editing, Mary Robert Carter for managing the editorial process, Keri Schreiner for copy editing, Roxanna Usher for proofreading, Kate Doughty for graphics design, and Ben Somberg and Wendy Koch for their help in launching this paper.

Suggested Citation

Huether, P. 2021. *Siting Electric Vehicle Supply Equipment (EVSE) with Equity in Mind.* Washington, DC: ACEEE. www.aceee.org/white-paper/2021/03/siting-electric-vehicle-supply-equipment-evse-equity-mind.

Abstract

States are increasingly using electrification to reduce the greenhouse gas emissions and air pollution created by the vehicles on their roads. The push for electrification includes directing utilities to support the growing number of electric vehicles (EVs) by investing in widespread charging infrastructure, known as electric-vehicle supply equipment (EVSE). All forms of vehicular transportation—including personal and rideshare vehicles, transit and school buses, and medium- and heavy-duty vehicles—will need EVSE if they are to be electrified. As this transition gets underway, states and their utility commissions are also recognizing the importance of equity; i.e., they are trying to ensure that historically underserved communities reap the benefits of investments in electrification. In this paper, we analyze (1) the extent to which states and utilities are including equity in their EVSE siting and (2) considerations to help ensure the benefits of transportation electrification (TE) reach all communities.

Low- and moderate-income communities and communities of color, in particular, stand to benefit greatly from TE but are at risk of missing out on these benefits due to a lack of charging infrastructure. As a result, states and utilities have dedicated millions of dollars toward charging infrastructure in underserved communities. This investment, however, has not been evenly spread throughout the country. California and New York represent the vast majority of investment dollars committed to date, although there is increasing activity in other states pursuing TE. More recently, Colorado has approved millions in utility investments in EVSE for underserved communities and communities facing severe air pollution.

States and utility commissions should direct utilities to include the needs of underserved communities in their TE planning and dedicate funding to these communities if they are not already doing so. These communities need direct investment to take advantage of the benefits from the expected expansion in EVs over the next decade or two. There should also be state-wide metrics for success and criteria for eligibility, recognizing that equity is multifaceted and involves considerations of socioeconomic status, race, and more.

Meaningful community engagement is critical to the success of EV charging investments in underserved communities. Without this meaningful engagement, millions of dollars in investments could be wasted on chargers that are not utilized by the communities they were intended to benefit. Good—and early—community engagement can inform program design to help ensure it addresses real, current needs and helps build trust with underserved communities. Meaningful engagement includes involving community members and trusted organizations before and during the early stages of projects and deferring to the needs of communities regarding investment priorities when possible.

Introduction

In 2018, the transportation sector accounted for 28% of U.S. greenhouse gas (GHG) emissions, making it the largest single source of emissions in the country. Of total U.S. transportation emissions, 59% came from passenger vehicles, 23% came from larger trucks and commercial vehicles, and the remaining emissions came from aviation, ships, and other sources (EPA 2020). Electrifying transportation, combined with the continuing decline in electricity sector emissions, will be critical to substantially reducing transportation emissions. Although electric vehicles (EVs) produce no emissions at the tailpipe, the electricity that powers them is not always emission free. However, even after accounting for the emissions from electricity generation, EVs are still generally cleaner than internal combustion vehicles. Electric passenger vehicles on average produce fewer emissions than conventional vehicles nationwide, even when those EVs are large models, such as SUVs or pickup trucks (Reichmuth 2020). Electric trucks and other commercial vehicles are also more efficient and produce fewer emissions than their conventional counterparts (Nadel and Junga 2020).

However, supporting the millions of new EVs necessary to achieve meaningful vehicle electrification will require developing ambitious charging infrastructure nationwide. Of the more than 250 million personal vehicles on the road in the United States today, fewer than 2 million are EVs, but this number is expected to reach 18 million by 2030 (EV Hub 2020c; Cooper and Shefter 2018; Energy Innovations 2020). Large investments in charging infrastructure will be necessary to achieve these sales figures, with one report estimating that we will need almost 2 million public chargers that drivers can use away from home (Hagerty, Sergici, and Lam 2020). This does not include the charging needs of larger EVs such as transit, school buses, and commercial trucks. These vehicles are increasingly going electric as fleet vehicle operators—such as transit agencies and shipping companies—and policymakers recognize the multiple benefits of electrification.

State and local governments increasingly want to ensure that EV investments are equitable and provide benefits to all communities, not just wealthy early adopters. Because investments in charging infrastructure will shape communities' transportation options for decades to come, it is important for these investments to be thoughtfully sited. Decision makers must ensure that investments in charging infrastructure reach low- and moderate-income (LMI) households, communities of color, and communities with high pollution burdens. Equity in electric-vehicle supply equipment (EVSE) siting is also important given the impact that climate change will have on LMI communities and communities of color, which have higher rates of heat-related deaths and experience greater damage from storms and floods than wealthier and whiter communities (Turrentine 2019). A few states are leveraging their Volkswagen Settlement allocations to invest in EV charging infrastructure with a focus on equity. These and other states have the opportunity to prioritize LMI and other underserved communities when awarding the remaining $2.3 billion of the total $2.8 billion awarded to states (Smith 2020).

States and their utility commissions have the authority to approve utility transportation electrification (TE) programs and set standards to incorporate equity into utility plans. This report examines the extent to which utilities ensure that EVSE investment and siting decisions support equitable access to electrified transportation. While numerous guides and handbooks offer guidance to cities and utilities on best practices for siting charging infrastructure, few, if any, offer best practices for utilities siting EVSE in LMI communities. First, we outline our

guiding research questions and methodology. We use a variety of sources and interviews to present an overall picture of the state of equitable EVSE siting. We then present what states and public utility commissions (PUCs) are requiring of their utilities with regard to locating charging infrastructure in LMI communities and the range of EV uses considered. Throughout the report, we will be using the language and definitions used by the individual states, PUCs, and utilities to target certain communities for programs; nationwide, there is no common definition for an LMI community, and so we did not provide one in this report.

Next, we examine utility filings[1] to capture the investments they are making, and we conclude with a discussion of community engagement efforts. We explore best practices in community engagement and how community needs can be best included in utility EVSE programming, which has not been fully explored to date. We also present two examples of utilities engaging thoughtfully with local communities and stakeholders, as well as some good practices to model. Our hope is that this report can offer insights into how equity is and can be included in utility EVSE plans to ensure that the benefits of TE reach all U.S. communities.

Barriers to Transportation Electrification

To support GHG and pollution reduction goals and ensure equitable and affordable transportation options, EV uptake must extend beyond early adopters. Reaching those who may face barriers to accessing EVs—LMI households, for example—will be critical to reaching wider goals. While LMI households are less likely to have access to a personal vehicle compared to higher income households, they are still very dependent on cars: 80% of those living in poverty and almost 90% of those between 100% and 200% of the federal poverty level (FPL) have access to a car (Cournoyer 2018). A study of LMI households in California underscored this reliance on personal vehicles and the need for targeted incentives to address up-front cost concerns (Pierce et al. 2019). Achieving broader social and environmental goals will require broad EV uptake and, critically, the infrastructure to support these EVs.

A major reason for the lower uptake of personal EVs by LMI households is the price of current EVs. At the moment, EVs can have steep up-front costs, upward of $40,000–60,000 (Lutsey and Nicholas 2019); as a result, they are largely owned by higher income individuals. One national study found that 56% of EV owners had household incomes over $100,000, including 17% with incomes over $200,000 (CarMax 2017). Another study found that 80% of EV owners in Maryland had household incomes above $100,000 (Farkas, Shin, and Nickkar 2018).

The lower uptake among LMI households presents a classic chicken-and-egg problem. Private companies are less likely to invest in public charging infrastructure in communities with low EV uptake, where few could or would take advantage of such infrastructure, but a lack of charging infrastructure is a barrier to EV uptake. In fact, by one estimate, the top 20 zip codes nationwide with the most chargers had a median home price of almost $800,000, reflecting locations in which EV charging demand and profitability for charging companies are likely highest (Richardson 2019).

[1] A *utility filing* is a document submitted by a public utility to a government regulatory body, typically a public utility commission, requesting approval to fund services and programs. For the purposes of this report, we examine only final decisions on filings by the relevant regulatory body.

Fortunately, EV uptake should increase over time as new vehicle prices fall and used EVs become more available. EVs are projected to become cost competitive with conventional vehicles within the next 5–10 years largely by virtue of rapidly falling battery prices (Lutsey and Nicholas 2019). The used EV market is expected to expand alongside the new EV market, with a greater number of longer-range used EVs becoming available at more affordable prices (Sclar and Werthmann 2019). This should improve the case for private EVSE investment and expanded charging access. However, public and utility funding for EVSE will likely still be needed in LMI communities and communities of color alongside private, non-utility investment.

A lack of charging options and so-called *range-anxiety*—that is, the fear of not being able to drive far enough on a single charge or the battery running out before reaching a charging location—are often cited as reasons that consumers are hesitant to purchase an EV in the first place (AAA 2019, 2020; Povich 2020). This gap in accessible public charging can hinder the success of many of the TE plans and policies that states have enacted (C2ES 2019; O'Kane 2020). Widespread TE requires that all communities have access to electrified transportation, not just the wealthy and early adopters. Widespread TE will also require investments in charging infrastructure to support transportation beyond personal vehicles, including larger vehicles such as trucks and buses.

Policymakers nationwide are also addressing racial and economic inequities in our transportation system; such inequities have historically excluded LMI communities and communities of color from transportation solutions and have increased their exposure to localized pollution. Communities of color, for instance, were significantly disrupted by the construction of the U.S. interstate highway system, having little say in the decision-making process, and they are still disproportionately burdened to this day by vehicle pollution. These inequities extend to transit access as well, as transit quality and frequency are often substandard in communities of color, if those communities have transit at all (Valentine 2020; Spieler 2020).

All aspects of the transportation system need investment to ensure widespread TE, and utilities have a role to play in each aspect. These different use cases also have different equity benefits due to their use by certain communities and their economic and environmental impacts. Table 1 outlines some of these use cases and benefits.

Table 1. EVSE use cases and equity benefits

EVSE use case	Equity benefits
Charging in multi-unit dwellings	Investment may be more expensive and challenging than in single-family homes, increasing the need for utility investment. Because these residents are disproportionately LMI, EVSE investments increase equity.
Ride hailing/Ridesharing	These services increase access to an affordable and clean mobility option for drivers and passengers who often have low or moderate incomes.
Transit electrification	LMI communities and communities of color often rely on public transit, and emissions from transit buses disproportionately harm these communities. Utility investment in EVSE can accelerate transit electrification and pass the benefits on to communities in need.
Medium- and heavy-duty electrification	Emissions from these vehicles disproportionately harm LMI communities and communities of color. Utility investment in EVSE supports their electrification and reduces harm.

Transportation Electrification Benefits

LMI communities and communities of color could greatly benefit from TE as they are disproportionately burdened by transportation-related air pollution. They are often located near highways and other major sources of air pollution, including power plants and industrial sites, leading to serious negative health impacts including higher rates of heart disease and asthma (Welch 2017). The higher pollution levels in these communities are linked to greater rates of hospitalization, respiratory and cardiovascular disease, and mortality (Miranda et al. 2011). One study of Minneapolis and St. Paul, Minnesota, found that rates of premature death were 45% higher in high poverty neighborhoods and 33% higher in communities of color. Rates were worse for respiratory hospitalizations: 68% higher for high poverty neighborhoods and 66% higher for communities of color. These results were attributable to the higher levels of particulate matter and ozone in these neighborhoods (Bael and Sample 2015).

Eliminating tailpipe emissions from personal vehicles, taxis, and medium- and heavy-duty vehicles can all help reduce levels of pollution in these communities. Buses typically run on diesel, and their emissions contribute disproportionately to the dangerous air quality in many LMI communities (Roberts 2018; King County Metro 2020). Low-income communities and communities of color are also more likely to be located near highways, ports, and truck routes, all significant contributors to pollution and poorer health outcomes (Katz 2012; Houston 2019). Electrifying buses, trucks, and other heavier commercial vehicles, in particular, should therefore be a priority. To ensure that the air quality benefits associated with electric transportation are realized by LMI communities, equitable access to EVSE is essential. This includes electrifying bus depots in LMI communities to tackle emissions from idling or prioritizing charging for buses or trucks with routes through LMI communities. In the latter case, the charging infrastructure need not be located in an LMI community or community of color, so long as the pollution reduction benefits reach these communities.

LMI communities could also benefit from electrification due to cost savings, as these communities have high transportation costs and spend a large percentage of their income on energy. While the up-front cost of EVs should decline over time, EVs already have lower total

costs to own than many conventional vehicles since they have lower maintenance needs and charging an EV is often cheaper than filling up the tank with gas. One report found that the savings from driving an EV could be as high as $10,000 over the lifetime of the vehicle (Harto 2020). LMI and non-white households also pay significantly more for transportation, especially for gasoline, as a percentage of their income (see forthcoming ACEEE white paper on transportation energy burdens to be released summer 2021*)* and expanding EV access can reduce this burden. However, without the necessary charging infrastructure, these households will not be able to take advantage of EVs.

Other tools for expanding access in LMI communities include car-sharing programs and electric bus options. One example is the innovative BlueLA car-sharing program, which provides access to EVs for low-income communities in Los Angeles. Funded by California's cap-and-trade program, BlueLA funds shared EVs and the necessary charging infrastructure to provide an affordable mobility solution for communities that may not be able to afford to buy their own EVs (BlueLA 2020). Electric transit buses can provide transit agencies significant savings over the vehicle's lifetime—almost $500,000 compared to diesel buses by one estimate—allowing these agencies to maintain or improve service in underserved communities. Transit buses already provide a more affordable transportation option than driving for many LMI households, and they need support in electrifying given the high costs of charging infrastructure and the often limited budgets of transit agencies (CUB 2020).

However, EVSE underinvestment in LMI communities raises the risk that these communities will miss out on the benefits of TE. Moreover, states and cities will miss a critical opportunity to advance their broader GHG goals. Public and utility investment can help alleviate the harms these communities disproportionately face from transportation pollution and reduce their economic burdens by increasing mobility options. Consequently, public and private charging infrastructure also needs to be available in those communities for everything from personal vehicles to buses to heavy-duty vehicles.

Challenges for EVSE Investment

Siting EVSE in LMI communities is not without its challenges, including the availability of parking that makes EV charging possible. Low-income households are significantly less likely to have parking that can accommodate charging infrastructure. Less than 20% of households making $25,000 a year or less have access to charging-capable parking—that is, a dedicated parking space that has an outlet within 20 feet—compared to almost 80% for households making $100,000 or more (Traut et al. 2013). This is partially because lower-income households are more likely to live in apartments, while higher-income households are more likely to live in single-family homes. Almost half of households living in apartment buildings or multi-unit dwellings (MUDs) make less than $35,000 (NMHC 2020). Installing charging infrastructure in MUDs, especially for renting households, may require retrofitting of parking structures and could prove costly. Obtaining approval from building management or homeowners' associations may also be a challenge given the split incentives between residents and building owners or managers, as the latter may see no financial benefit in funding or enabling the investments (Orenstein 2020; Drive Electric Florida 2012; Baldwin, Myer, and O'Boyle 2020). While offsite DC fast charging (DCFC), which charges batteries more rapidly, has been discussed as a way to serve MUD residents, the charging rates at these stations are often set at higher, commercial prices. Charging at these rates is not a good alternative to at-home

charging at residential rates and can exacerbate cost concerns for LMI households (CPUC 2020b).

Another challenge to widespread EVSE investment in LMI communities is the use of multiple modes of transportation as opposed to using personal vehicles exclusively. Low-income households disproportionately use transit and rely on ride hailing (where an individual requests a driver usually via a smartphone application) as both passengers and drivers (Clark 2017; Lyft 2020b). LMI communities may use EVSE not only for personal use but also to support alternative mobility options like ride hailing as both drivers and passengers. Lyft (2020b) reports that 44% of its rides either start or end in low-income areas, and that its drivers are disproportionately low income and lack at-home charging capabilities. Ride-hailing drivers also are more likely to require public charging given the logistics of their daily driving—that is, drivers may need to charge more than once per day, and it may be inconvenient to drive home to do so. Fast charging in areas with high demand for ride hailing, like the downtown areas of major cities, is particularly beneficial for drivers. Ultimately, time lost searching for chargers translates to lost income (George 2018).

Both Lyft and Uber have committed to having 100% of vehicles on their platforms be all-electric by 2030 (Lyft 2020a; Hawkins 2020). A lack of charging infrastructure in certain communities can therefore limit these services as an option for both drivers and passengers. Low-income drivers may find it hard to comply with these policies, and residents of underserved areas may have fewer drivers available if there is a lack of charging infrastructure. It can also compromise an important source of income in some communities. Ensuring that passengers and drivers can benefit from clean mobility options requires extending charging infrastructure access to both groups.

LMI Americans are more likely than higher-income Americans to use public transit. One analysis found that commuters driving alone made over $4,000 more annually on average than transit commuters, and this finding was widespread across the nation (Maciag 2014). Buses, in particular, are disproportionately used by LMI Americans, with 69% of riders coming from households making less than $50,000 a year (Clark 2017). African Americans are also more likely to use transit, representing 30% of bus riders despite being just 12% of the population (Patterson 2020). Providing adequate charging infrastructure to electrify transit buses is a problem that must be solved if communities are to maximize the benefits of TE.

The Role of Utilities

Utilities have a unique role to play because PUCs and states generally require that ratepayer funds lead to equitable outcomes. This often involves ensuring equitable outcomes based on customer class and income as well as (in some instances) racial equity or environmental justice (EJ) considerations. Utilities are commonly required to set aside a certain portion of their energy efficiency programs for LMI customers, and many states have permanent working groups to integrate the concerns of LMI customers into program design (ACEEE 2020). Utilities can help ensure equitable access to charging infrastructure, especially by filling in gaps left by the private market. In the case of public charging infrastructure, utilities can work closely with other stakeholders, including representatives from LMI communities and communities of color, to determine the most beneficial sites and uses for utility investment. Later in this paper, we

present two examples of utilities successfully collaborating with communities to tailor EVSE investments to their specific needs.

Utilities can also work with fleet operators to support the electrification of larger vehicles, including transit buses, which can benefit LMI communities by reducing the heavy pollution burdens that they bear disproportionately. These vehicles, generally referred to as medium and heavy duty,[2] run on diesel fuel and generate pollution that impacts LMI communities and communities of color located close to main highways, industrial centers, ports, and bus and other fleet depots (AEE 2019). These communities may not directly benefit from utility investments in fleet charging, but they will benefit enormously from the electrification and reduced diesel emissions that this charging supports.

Charging transit buses can put a heavy strain on the grid if not well managed and may require more coordination with utilities than the construction of a charging station for an individual EV owner. Fleet operators generally develop a charging schedule for their fleet of EVs, and utilities must ensure that advanced rates or managed charging options are available to maximize the benefits from EV integration into the grid. Transit agencies may also need utilities' expertise when transitioning their bus fleets to electric. Close coordination between fleet operators and utilities is vital for medium- and heavy-duty commercial vehicles, which must also be electrified to reduce pollution burdens.

In addition to helping to electrify transit buses, utilities can play a role in supporting the charging of school buses, reducing the pollution exposure of some of the most vulnerable residents of LMI communities—children. Because they have significant amounts of idle downtime, school buses are ideal candidates for grid-to-vehicle integration, serving as aggregated demand response resources (where idle, charged vehicles provide back-up power for the grid). The vehicle-grid integration of school buses and other vehicles can be enhanced through enrollment in time-varying rates or managed charging programs (Houston 2019). California is leading the way in the United States with its ambitious medium- and heavy-duty truck and bus electrification mandates, and utilities there are starting to investigate ways to manage grid demand from these vehicles (Nadel 2020).

Policymakers have recognized the role that utilities can play in advancing equitable TE. This report will offer guidance to utilities considering or already implementing equitable EVSE siting plans, as well as inform regulators and policymakers. Rural communities also have their own unique transportation needs and challenges, and exploring how TE will impact LMI communities will likely address many concerns of rural communities. For the purpose of this paper, we do not discuss the unique challenges of electrifying transportation in rural areas, but this could be an area of future research.

Evaluating Utility Activities

We developed three main research questions to assess the degree to which utilities are incorporating equity into their EVSE siting decisions and to better understand practices that utilities are already using to benefit LMI communities.

[2] Medium- and heavy-duty vehicles are typically buses, commercial vehicles, and heavy pickup trucks with a gross vehicle weight rating of more than 8,500 lbs.

- Which states (PUCs and legislatures) and utilities currently include a mandate or goal around equitable programming for underserved communities in their EV orders or plans? How is equity defined in those orders and plans?
- What is the role of equity in current utility methodologies and criteria used for siting EV charging infrastructure? What is the range of EV applications considered as part of these methodologies (e.g., personal ownership, ride hailing, car sharing, transit, shuttle service, school buses)?
- How are utilities and their partners engaging diverse community members in siting decisions? Which key stakeholder groups are utilities engaging to target underserved communities?

We examined utility plans and filings for equity metrics or goals as well as for the ways utilities are engaging with LMI communities and organizations. In addition to examining utilities, we investigated what information state utility commissions and legislatures are requesting of utilities in their filings and TE plans. We found that more and more states are developing TE plans and incorporating equity into their energy and climate change policies given both historical inequities and the expected impact of climate change on LMI communities and communities of color.

Methodology

Atlas Public Policy's EV Hub (2020a) was our primary source for utility filings as it is a central location for publicly available filings from across the country. This includes utilities' total EVSE investment amounts, information on target uses of EVSE, and investment carveouts for equity purposes. The Atlas database includes information on which stage the filing is in, the intended beneficiary or use target of the EVSE investment program, and a short description. This database, however, includes only filings to and final decisions from PUCs and only investments by investor-owned utilities (IOUs). Our data analysis, therefore, excludes the programs and investments by municipally owned utilities and rural electric cooperatives. To our knowledge, no comprehensive database of these investments exists. We do, however, include one case study on a municipally owned utility, Seattle City Light, later in this paper.

The filings of greatest interest for our purposes are the four categories of EV charging investments: financial incentives or rebates, line extensions, make-ready investments, and utility-ownership investments. Other filing types of interest include education, evaluation and administration, stakeholder engagement, and research and development. The use targets include markers for what the filing is intended for, including MUDs, underserved communities, transit, and school buses. EV Hub includes short descriptions for each filing, which we used to estimate the percentage of the total investment amount that was dedicated to underserved communities. The definition of underserved or LMI communities can vary by state or utility.

We began our investigation with the 52 utilities included in ACEEE's 2020 *Utility Energy Efficiency Scorecard* (Relf et al. 2020).[3] Additional utilities we included are members of ACEEE's working group on expanding EVs in LMI communities, a peer-to-peer learning group

[3] The 2020 *Scorecard* included the top 52 electric utilities in United States by retail sales volume, using 2017 retail sales data published by the U.S. Department of Energy's Energy Information Administration.

comprising more than 40 utilities dedicated to advancing the use of EVs in LMI communities. We included additional utilities in our analysis if they were designated in Atlas EV Hub as having an approved EVSE filing that serves underserved communities. Our final list of utilities includes 78 utilities located in 36 states, and we investigated state actions in each of these states.[4]

We then read utility commission documents and news reporting on state legislative efforts to see if states were including equity in their utility EVSE investment orders. We identified states in which legislators or regulators included language specifically calling on utilities to include LMI, racial, or EJ concerns in plans or in which utilities' EVSE plans must consider impacts on LMI communities and communities of color. While legislation or commission orders did not always speak to the needs of LMI communities, they often addressed the various uses of or locations of EVSE that impact LMI communities, such as in MUDs or for transit or school buses. We also documented states in which legislators or regulators included requirements for EVSE investment for use cases other than personal vehicle use, as these requirements have a strong impact on where EVSE is sited and who benefits from electrification.

Finally, we conducted interviews with utilities on our list that have noteworthy approaches to community engagement or programs intended to greatly benefit LMI communities. This supplemented our research into best practices and models for effective and inclusive community engagement around TE.

Findings

STATE AND PUBLIC UTILITY COMMISSION PLANS

States are increasingly urging their regulated utilities to pursue TE to achieve ambitious GHG reduction goals in addition to local pollution reduction goals. At the same time, concerns around equity and inclusion in climate change mitigation strategies are also growing due to the historic and expected climate change and localized pollution impacts in many LMI communities and communities of color. Different states are taking different approaches to TE, including offering incentives for EVs and EVSE, setting goals for EV penetration, electrifying their own fleets, and electrifying their transit bus systems (EV Hub 2020b).

A few states and their PUCs are also directing regulated utilities to invest in EVSE with an eye toward equity. Among the 36 states on our list, six have a law or commission order directing their utilities to incorporate equity into their TE or EVSE investment plans. Many of these directives also mention the need for EVSE investment, highlighting the equity benefits of investing in MUDs and transit-charging infrastructure.

[4] Utilities were examined at the state-subsidiary level given the variation in policy by state.

Table 2. State laws and utility commission orders regarding EVSE with equity

State	Description
Arizona	Arizona Corporation Commission decision #77289 outlines how state utilities will implement the state's EV plan. It also encourages utilities to explore deployments in rural and low-income areas, in MUDs, in other underserved areas, and for school and transit buses (ACC 2019).
California	Senate Bill 350 requires state regulators to examine barriers to TE for disadvantaged communities, which include low-income communities and communities of color. It also directs utilities to address these barriers in their EVSE plans (CEC 2018). Assembly Bill 841 also requires that a minimum of 35% of utility investment in charging infrastructure go toward underserved communities (Borgeson and Baumhefner 2020).
Colorado	Senate Bill 19-077 directs utilities to file TE plans every three years and consider LMI and underserved communities (Colorado General Assembly 2019).
New Mexico	House Bill 521 directs the commission to consider whether a utility's application related to TE is expected to increase access for low-income drivers—those making less than 200% federal poverty level (FPL)—and for underserved communities or jurisdictions in which the median income is less than 200% FPL (New Mexico Legislature 2019).
New York	Pursuant to the state's GHG and EV goals, the commission ordered utilities to invest in EVSE with special considerations for LMI and EJ communities. This includes higher incentives and special prizes (New York DPS 2020).
Oregon	Senate Bill 1547 requires utilities to file proposals for programs to expand TE and that LMI communities be a focus of these efforts. A subsequent commission order requires utilities to file TE plans, which must discuss how the utility will address barriers for traditionally underserved communities (Oregon PUC 2019).

Equity considerations vary by state both in how they define the communities in need of help as well as in the type of investment, with some focusing more on personal vehicle charging for residents of MUDs and others stressing the need for medium- and heavy-duty electrification. The three most common community designations are LMI communities, EJ communities, and disadvantaged communities (DACs). These designations can describe different communities, are inconsistent across states, and can have ramifications for who benefits from the investments. For the purposes of this white paper, we examine plans addressing any of the designations because they all address concerns around equity.

The designations are important because they can define what constitutes a community in need of greater attention and which communities need larger subsidies or financial prioritization. Whether or not a community is included in one of these designations and which designation a state or utility uses can have material impacts on where investments are made. It is important that policymakers' think critically about the designations they use and their eligibility criteria. These decisions should be informed by both input from communities and overarching state equity, air quality, climate, and mobility goals. It is also important that state policymakers or

utility commissions establish clear, state-wide definitions and eligibility criteria if they have not already done so. This will improve evaluation and allow easier cross-utility learning about which strategies and projects are most successful.

In California, for instance, communities are designated as DACs if they meet certain economic, health, and environmental criteria, while the California Public Utility Commission (CPUC) has a broader term—*Environmental and Social Justice communities*—that includes DACs as well as all tribal lands and low-income areas. The state has developed its own tool, CalEnviroScreen, to designate census tracts as DACs based on factors such as poverty rate, unemployment, pollution, the presence of hazardous waste, and health outcomes (CPUC 2020a). This definition goes beyond the simple income or racial makeup designations and may channel investment into different communities than would receive funding under a simpler definition. For example, communities with slightly higher incomes but that are severely burdened by pollution may be included at the expense of lower income communities. Only one other state has a similar tool (Washington State's Environmental Health Disparities Map), so it may be more difficult to draw direct lessons from California's experience. However, one important lesson for other states is the importance of looking beyond income when assessing need (M. Muller, attorney, NRDC, pers. comm., 2020). In Colorado, the utility commission recently approved a TE plan by Xcel Energy that includes a stakeholder engagement process between Xcel and heavily polluted and LMI communities to determine qualifications for greater investment (Colorado PUC 2020).

Many states are less prescriptive and directly address only income as a barrier to EV access. The Arizona Corporation Commission (2019) simply encourages its regulated utilities to explore siting EVSE in rural, low-income, and other underserved areas. In New Mexico, the legislature directs utilities to submit and the commission to approve TE plans that increase access for users making less than 200% of the FPL and communities with a median income below this level (New Mexico Legislature 2019).

Focusing investments solely on individuals and communities with lower incomes has the advantage of being simpler to implement given that data on communities' median income are widely available and utilities already target LMI households for other programs. Programs with income criteria are widespread and can be more easily implemented once a threshold has been established. However, a solely income-based approach ignores numerous other barriers—especially race—as well as the need to ameliorate harms to heavily polluted communities.

Race continues to play a crucial role in determining a person's access to resources and impact from pollution. Minority-owned businesses have less access to credit on average compared to similar white-owned businesses, and Black communities in particular are often isolated from major job centers; both of these factors limit the available resources in many communities of color (Congressional Black Caucus Foundation 2015). Adding criteria around race, tribal status, or pollution burden to income requirements—as California does with its DAC designation—would allow programs to better target the neediest individuals and rectify some wrongs in current transportation systems. Compared to white communities, communities of color are more likely to live farther from work and have more unreliable commutes, partially due to their reliance on public transit. Failing to recognize the racial inequities in transportation policy can also exacerbate other forms of inequity, including racial segregation (Creger, Espino, and Sanchez 2018).

State Highlights

California. California's SB 350, the Clean Energy and Pollution Reduction Act of 2015, requires the California Energy Commission and the California Air Resources Board (CARB) to identify barriers to clean transportation for low-income residents and provide recommendations. CARB's barrier study recommends expanding assessments of clean transportation needs, developing an LMI outreach plan, expanding funding for clean transportation projects and infrastructure, and making participation and access to these programs as easy as possible (CEC 2018). The bill also requires California's IOUs to develop TE plans that identify equity-related barriers and goals and strategies to address them, drawing from CARB's barrier study. The framework recommends that IOUs design their programs specifically with DACs in mind, partner with and seek input from these communities, and develop metrics to track their program's effectiveness in addressing equity barriers (CPUC 2020b).

New York. With the passage of the Climate Leadership and Community Protection Act, New York State has committed to reaching net zero GHG emissions by 2050, which will require significant TE. This act also includes a requirement that at least 35% of the benefits are realized by historically disadvantaged communities (Morris and Famer 2019). In addition, New York is a signatory to the Multi-State Zero Emissions Vehicle (ZEV) Memorandum of Understanding, which commits it to have 850,000 ZEVs on its roads by 2025. Pursuant to these goals, the Public Service Commission directed its staff to develop a report on New York's infrastructure needs over the long term to support widespread TE. This ultimately led to an order requiring New York's regulated utilities to establish ambitious make-ready programs, collectively totaling more than $700 million. The commission also recognized the importance of equitable access to charging infrastructure and authorized higher incentives for investments in LMI and EJ communities. In addition, it established specific prizes to reduce air pollution and increase mobility in disadvantaged and EJ areas. Transit and medium- and heavy-duty specific programs were also authorized and must support a direct reduction in emissions in EJ communities in addition to funding for DCFC sites in rural communities (New York DPS 2020).

UTILITY INVESTMENTS

Since 2012, utility commissions from 25 states and the District of Columbia have approved almost $2.4 billion in EVSE investments and incentives intended to support almost 200,000 charging stations. Of that amount, the vast majority of approved programs—about $2.1 billion worth—from 61 filings have some focus or prioritization on underserved communities (as designated by Atlas) or on DACs for California programs. These filings come from 18 utilities and 11 different states but, as we discuss below, the vast majority come from California and New York. As table 3 shows, make-ready programs (discussed below) represent the largest portion of these investments, followed by financial incentives for EVSE and utility-owned EVSE investments. We analyzed filings and orders published on Atlas EV Hub as of September 22, 2020.

Table 3. Approved utility EVSE investments with equity

Investment type	Number of filings[5]	Dollar amount (millions)	Percentage
Make-ready	34	$1,574.4	77%
Incentives	15	$377.1	18%
Utility-owned EVSE	12	$106.4	5%
Total	61	$2,058.0	100%

EVSE Investment Types

Make-ready: The utility pays for upgrades to the infrastructure to prepare a site for a third party to install the final equipment. This is often a greater investment in the grid infrastructure than what is already required of utilities. The ownership, operations, and maintenance of the charging equipment is retained by the third party.

Incentives: The utility offers a rebate to support the necessary electrical upgrades and charging equipment. The rebate level can vary by recipient, such as a more generous rebate for use in MUDs or for low-income recipients.

Utility-owned EVSE: The utility finances all necessary grid upgrades and charging equipment. The utility also operates and maintains the equipment, thus assuming all the risks and benefits. This model may fill in where the private market may not deliver, but it also risks crowding out private investment.

Source: Allen et al. 2017

However, not all of the approved $2.1 billion will go to underserved communities. While funding recipients vary by utility, most of these plans include specific carve outs for LMI or DACs, either as a percentage of the overall investment or a fixed number of charging stations or rebates. The amount designated for underserved communities varies, however, with percentages as low as 10% and as high as 50% of the total investment amount. Smaller amounts of investment are from programs where a fixed number of charging stations are designated for DACs or the entire program is geared toward DACs.

We estimate that of the $2.1 billion approved by regulators, at least $646 million has been earmarked for EVSE in underserved communities. This largely comes from programs with percentage requirements (e.g., 30% of funds are reserved for LMI communities) and programs designated entirely for underserved communities. The exact amount will vary as utilities implement these programs, with the final expenditure in underserved communities dependent on the level of interest in these communities and future priorities. The $646 million also does not include programs that prioritize underserved communities or that offer greater subsidy in these communities but do not have a fixed amount set aside. Finally, this number is also an underestimate of the total amount to be invested by utilities because it does not include municipally owned utilities and rural co-ops. It also does not include investments made by IOUs and added to the Atlas database after we concluded our data analysis. One example of this more

[5] Many utility programs include multiple EVSE investment types. While a utility may use different types in tandem, the elements in this database are separated by investment type.

recent activity is Colorado, where Xcel Energy's $110 million plan was approved and includes $22 million for underserved communities (Smith 2021).

Similar to the $2.1 billion total, the $646 million earmarked for EVSE in underserved communities is divided among the major EVSE investment types. However, higher portions of the money designated for underserved communities come from incentives (20%) and utility-owned EVSE investments (6%). Overall, these investments should support an estimated 2,270 DCFC ports, almost 181,000 Level-2 (L2) ports, and more than 21,100 ports designated for medium- and heavy-duty EVs. This compares to more than 76,000 public L2 ports and almost 17,000 public DCFC ports in the United States today (AFDC 2020).

California and New York State represent the vast majority of the overall $2.1 billion in public investment with some focus on underserved communities, at 72% and 24%, respectively. California represents a slightly larger amount of the public funding designated for underserved communities, at 83%, compared to New York's 15%. The state with the next greatest amount of investment is Massachusetts, with two filings totaling over $47 million, with 10% of that designated for DACs. The three utilities with the largest approved investments were all in California (Southern California Edison, Pacific Gas & Electric, and San Diego Gas & Electric), while the next two were in New York (ConEd and National Grid).

Case Study: National Grid

National Grid has plans to invest approximately $50 million for TE across the three states it operates in: Massachusetts, New York, and Rhode Island. This includes make-ready EVSE programs, off-peak rebates, and fleet advisory services. In Massachusetts, National Grid has already installed 250 charging stations through its make-ready program, with another 200 in the pipeline. Through this program, National Grid pays for 100% of the electric service upgrades to the site and provides a rebate for the charging station equipment. These rebates vary by recipient, with MUDs receiving a 75% rebate, EJ communities receiving 100%, and fleet and other private users receiving 50%. Thus far, National Grid has exceeded its target of siting 10% of its L2 chargers in disadvantaged or EJ communities, instead reaching 35%. It has also found that supporting fleet vehicle owners, especially transit and school buses, provides significant benefits to DACs.

While many approved filings do not specifically target funds for DACs, investments in charging infrastructure for MUDs, transit buses, and school buses may still benefit underserved households. Table 4 summarizes some of these investments.

Table 4. Summary of equity-focused utility investments*

Filing beneficiary	Benefits for underserved communities?	Number of filings	Sum of investment	Percentage of beneficiary subtotal
MUDs	Yes	20	$841,684,425	95%
	No	16	$42,394,034	5%
School buses	Yes	11	$643,744,736	94%
	No	5	$44,485,250	6%
Transit buses	Yes	11	$640,571,555	93%
	No	7	$48,530,030	7%

*Many filings benefit multiple charging users, including the above three. Larger filings, in general, have multiple intended beneficiaries.

Community Engagement and Metrics

Engaging with underserved communities on their needs and desires can greatly improve utility EVSE programming. Utilities generally solicit some stakeholder input when devising new programming, but the level and type of engagement can vary. LMI and other underserved communities face numerous barriers to TE and EVSE investment, so it is important that their particular concerns are heard and that implementors do not rely on preconceived notions of their needs and desires. Also, given that EV and EVSE programs are a new area of work for many utilities, it is important that they frequently update their understanding of the issues and their approach to program design.

Fortunately, there are guides for effective community engagement as well as examples of how utilities may best engage communities when investing in EVSE to maximize benefits for communities in need. A Smart Electric Power Alliance (SEPA) report (Bolduc et al. 2020) on best practices for EVSE deployment emphasizes creating a good customer experience, engaging the community, following up with customers, and tailoring programs to particular customer segments. For LMI communities specifically, SEPA recommends providing turnkey offerings that are supportive and streamlined. Making the process as easy as possible for those in most need is key. One example to watch is California's One-Stop-Shop Pilot Project, which aims to streamline access to transportation-related incentives for income-qualified consumers, provide education and outreach to community-based organizations, and connect consumers to other state incentives all through one web portal (Grid Alternatives 2021).

SEPA also emphasizes the need to think more expansively about the TE needs of these communities, including electrifying transit and car sharing, and the need to address the economic and environmental harms and barriers communities may face. This may mean focusing on EV charging for MUD residents, expanding EV choice by lowering the price of EVs, improving access to used EVs, and prioritizing the electrification of fleets to reduce exposure to air pollution (Bolduc et al. 2020).

Other organizations have also put together frameworks to guide utilities and other actors in their efforts to incorporate equity into their plans. One such guide is the Greenlining Institute's Mobility Equity Framework, which aims to inform decision makers, communities, and advocates as they elevate inclusion in their transportation work, as well as provide a tool for

empowering communities in the decision-making process. While this framework was specifically designed for California and primarily examines equity through a racial lens, utilities and others from across the country can lean on it for their own TE programs. The framework involves three main steps that practitioners and implementers can follow:

- Identify the mobility needs of a specific low-income community of color.
- Conduct a mobility equity analysis to prioritize transportation modes that best meet those needs while maximizing benefits and minimizing burdens.
- Place decision-making power in the hands of the local community.

A community needs assessment, which should include meaningful outreach to and education of the community, is the framework's foundation and informs steps 2 and 3. Within the equity analysis (step 2), the framework also includes 12 mobility equity indicators to assess if the project increases access to mobility, reduces air pollution, and enhances economic opportunity. Some of these indicators include frequency and consistency of transit, quantity of air pollutants, presence of fair wages and labor practices, and local hiring agreements. The final step involves presenting these project options to the community and empowering them to decide which projects to pursue, including through participatory budget making (Creger, Espino, and Sanchez 2018).

The Greenlining Institute also published a toolkit to operationalize this framework for pilot projects. The toolkit includes basic questions for evaluating whether a program is equitable and follows community engagement best practices. The toolkit's questions ask program administrators to consider the following:

- Does your program or policy have dedicated set-asides for vulnerable communities?
- Have you designed a process to collaborate with vulnerable populations that engages and empowers them in a meaningful, authentic, and culturally appropriate manner?
- Does the program or policy generate burdens (including displacement and increased costs), either directly or indirectly to vulnerable populations?
- Does the program or policy help foster the building of effective, long-term relationships and trust between diverse communities and government?
- Does the program or policy align with and support existing community priorities, creating an opportunity to leverage resources and build collaborative partnerships?
- Does the program or policy include health, economic, or other objectives?
- Does the program evaluate the equity impact of your program or policies? Who is involved in the equity metric selection, data collection, and review?
- Does the proposed action have appropriate accountability mechanisms to ensure that vulnerable communities will equitably benefit and not be disproportionately harmed?

Case Study: Puget Sound Energy

The initial 2018 Puget Sound Energy (PSE) EV charging products and services filing proposed three low-income pilot programs designed in partnership with low-income assistance agencies in the Washington State Community Action Partnership network. As conversations around the pilots continued, PSE recognized the critical need to gain additional community input as to whether those projects would be the most impactful, or whether there were additional use cases that could also benefit our low-income customers.

In May 2019, PSE and Hopelink co-hosted an electric mobility workshop with 20 South King County mobility stakeholders. Attendees represented a mix of government and public transit agencies, policy advocates, and nonprofit organizations. The workshop discussions included current electric mobility technologies, the state of mobility in South King County, and a series of brainstorming exercises in which five small teams presented business plans for programs designed to address an existing mobility gap or opportunity in their communities.

In late 2019, PSE conducted follow-up conversations with nonprofits, government agencies, community service organizations, and private mobility organizations to better understand the current ecosystems in the proposed electric mobility use cases and potential benefits or barriers to electrification. PSE then developed a decision matrix to prioritize and strategize use case implementation. All proposed use cases were assessed across seven factors: scalability, replicability, projected community benefits, agency interest, pilot implementation timeframe, EV availability and cost, and overall project viability.

In early 2020, PSE finalized a set of low-income pilot projects designed to promote equitable access to electric mobility and the distribution of resulting environmental, social, and economic benefits. PSE is working with partner organizations to create mutually agreeable EV pilot project plans that document feasible operational design, propose budget and cost-sharing models, and identify potential electrification benefits and their corresponding metrics. Project development and deployment is in progress for the following EV use cases: low-income weatherization fleets, tribal transportation, community car share, school buses, and non-emergency medical transportation (M. Martin, community projects manager, PSE, pers. comm., 2020).

Community engagement best practices include running focus groups, doing surveys, working with community-based organizations, and participatory budgeting. Throughout the outreach process, cultural sensitivities should be considered including literacy levels, difficulties participating due to work and childcare obligations, and language barriers (Greenlining Institute 2019).

The National Association of State Energy Officials (NASEO), along with Facilitating Power and the Minnesota Department of Commerce, also examine stakeholder engagement and present an approach that elevates the voices of underrepresented communities in decision making. One tool they present posits that community engagement exists along a spectrum; organizations can identify where they stand along that spectrum and what their goal for community engagement is. Then they can plan activities to help reach that goal. Community engagement can vary from simply providing communities with information to involving them in the process to fully empowering them to drive program planning (Koewler et al. 2020). Table 5, created by Rosa Gonzalez of Facilitating Power, shows an abbreviated version of the spectrum.

Table 5. Abbreviated spectrum of community engagement to ownership

Stance toward community	Scale	Impact	Community engagement goals	Message to community	Activities
Ignore	0	Marginalization	Deny access to decision-making process	Your voice, needs, and interests do not matter	Closed door meeting, misinformation
Inform	1	Placation	Provide the community with relevant information	We will keep you informed	Fact sheets, open houses, presentations, billboards, videos
Consult	2	Tokenization	Gather input from the community	We care what you think	Public comment, focus groups, community forums, surveys
Involve	3	Voice	Ensure community needs and assets are integrated into process and inform planning	You are making us think (and therefore act) differently about the issue	Community organizing and advocacy, house meetings, interactive workshops, polling, community forums
Collaborate	4	Delegate Power	Ensure community capacity to play a leadership role in implementation of decisions	Your leadership and expertise are critical to how we address the issue	MOUs with community-based organizations, community organizing, citizen advisory communities, open planning forums with citizen polling
Defer to	5	Community Ownership	Foster democratic participation and equity through community drive decision-making; Bridge divide between community and governance	It is time to unlock collective power and capacity for transformative solutions	Community-driven planning, consensus building, participatory action research, participatory budgeting, cooperatives

Source: Gonzalez 2019

It is important to assess internally where current programming exists along this spectrum. Once this is determined, program leaders can work to update programming as needed to achieve their community engagement goals. Authors also stress the importance of engaging early and providing the necessary resources, including financial compensation, so that community members can fully participate. It may also be beneficial for the utility to reach out to community organizations that it does not normally work with to avoid perpetuating existing inequities (Koewler et al. 2020).

Atlas EV Hub includes information on whether the utilities plan to engage with residents of areas they designate as DACs to develop relevant EVSE siting programs and policies. The specific types of engagements include community meetings with DACs, trainings, website

engagement, specific events, and full needs assessments of the DAC. Unfortunately, 30 of the 61 filings, representing almost $1 billion in investment, have no stated engagement efforts (see table 6). Investments could be potentially wasted if EVSE is sited where it is not needed or for uses that do not provide the most benefit for these communities, and engagement is a major tool to assess this need. In-person and virtual engagements as well as needs assessment can provide critical information to supplement market-demand evaluations and projections. More utilities could be taking advantage of their pilot and early-stage programs to explore different forms of engagement and to rethink how they can build equity into their programming in a deliberate and systematic way.

A subset of the filings do, however, have a plan for some sort of community engagement. Eight of the 61 filings with a focus on underserved or LMI communities include a needs assessment. These filings represent $115 million in investment. Twenty-one of the filings, representing $910 million in investment, include a meeting with community members.

Table 6. Community engagement*

Type of engagement	Number of filings	Investment from filings (million $)
Meeting	21	$910
Event	4	$56
Website	14	$448
Training/Advising	10	$232
Needs assessment	8	$115
None	30	$956
Total	61	$2,058

*** The number of filings and amount of investment do not add up to the total because many filings (20 of 61) include multiple types of engagement.**

Case Study: Seattle City Light

Seattle City Light, a municipal utility representing the City of Seattle and a few surrounding communities, worked closely with EJ communities during the development of its Transportation Electrification Strategic Investment Plan. In this first phase of outreach work, City Light worked with Seattle's Department of Neighborhoods and met with more than 50 stakeholder groups, including 25 EJ community leaders, to get feedback on what its TE priorities should be. Discussions from this phase led the utility to prioritize investments in EVSE for MUDs and electrification of buses, highly used ride-hailing vehicles, and fleets in EJ communities, in addition to stressing the importance of outreach and awareness.

The communities also emphasized that public buy-in was important for success and that special care should be taken to avoid gentrification in neighborhoods that the utility invests in. Now, with the plan approved by the Seattle City Council, City Light will follow up with a second phase of outreach that will involve deeper conversations with community members and a collaborative approach to program development and implementation.

Seattle City Light is approaching outreach with equity in mind by relying on a number of principles, such as: 1) meet with organizations when and where it is convenient for them, and solicit input on how they would like to be involved instead of relying solely on past examples. 2) Include in program budgets money for childcare, food, interpretation services, and financial stipends to ensure equitable, accessible participation by community members. 3) Utilize a framework for community engagement—the Public Participation Spectrum from the International Association for Public Participation. Like the Facilitating Power tool, this framework emphasizes greater empowerment and involvement from the community, and using it informed the utility's outreach and future plans.

Source: Seattle City Light 2020

Community engagement can provide invaluable feedback on program design and should inform programming for LMI and underserved communities. The needs of a specific community may not be apparent or may not reflect the assumptions of utility planners. Community engagement can help ensure that the programming is tailored to the immediate needs of the community and can help with the program's long-term success. This engagement can also be crucial to building trust and buy-in from the community, while helping to create a more accurate baseline of current conditions, both of which can help ensure success from the investments. Siting EVSE without any community involvement may erode trust and can even be counterproductive to the program goals.

Because EV programs by utilities are still so new, they need continual improvement driven by outcomes and the feedback of communities involved. Robust data collection and the development of key progress metrics are essential to tracking success. MJ Bradley & Associates (Huntington and Culkin 2020) surveyed 12 utilities to get a better understanding of their EV programming, including their efforts to track progress. The survey found that seven respondents are tracking engagement with LMI communities, three are tracking the percentage of chargers placed in DACs, and one is tracking the percentage of chargers deployed, the total rebate amount distributed, and the percentage of applications received from DACs. One utility even modified its programming after speaking with the community and learning that EVSE may not have best served its needs. Most utilities also said that they provide routine updates to stakeholders, including social justice advocates. Three-quarters of those utilities have at least partially automated data collection systems, which can speed up the improvement process. The

survey also found that participating utilities achieved success through increased marketing efforts and having a wide variety of promotional efforts.

Table 7. MJ Bradley & Associates survey results

	Item measured							
Utility	Number of chargers installed	EV sales in utility service territory	Reductions in GHG and air pollution emissions	Investments in infrastructure	Participation in demand response	Charger utilization	LMI community charger deployment	Other
Program 1	X							
Program 3			X	X			X	Number of chargers enabled
Program 4	X	X	X	X		X	X	
Program 6	X	X				X		
Program 7								Rebate applications processed
Program 8	X	X	X			X	X	
Program 9	X	X		X		X	X	
Program 10	X	X	X	X			X	
Program 11								MWs avoided from system peak
Program 12				X				
Program 13				X				

*Programs 2 and 5 did not respond. The 11 utilities that did respond are (in no particular order) BGE, Seattle City Light, LADWP, PECO, PEPCO, PSEG Long Island, Southern California Edison, SMUD, ConEd, Duke Energy, and Eversource.

Tracking progress on equity goals is critical to ensuring successful programs, but we need further exploration as to which metrics are needed. Tracking includes not just tracking program

progress (e.g., number of ports installed in LMI communities) but also program success—namely, usage by community residents. Such tracking will provide invaluable feedback on what is and is not working and how to best update the programming to meet charging needs. The EV landscape is growing and changing rapidly, meaning that the assumptions made today may not apply in a few years. It is also important to have state-wide metrics of success so that policymakers and utility commissions can easily evaluate programs in their state and so that utilities can learn from each other. Being able to make apples-to-apples comparisons can accelerate learning and make it easier to track progress toward larger state-wide electrification and equity goals.

Conclusion

Widespread TE has the potential to reduce air pollution, lower GHG emissions, and improve mobility for underserved communities. Central to this transformation, however, is widespread and accessible charging infrastructure. States and utility commissions increasingly recognize this and are directing utilities to incorporate equity into their TE plans. We have found that some utilities have taken bold steps to site EVSE in underserved communities and to engage with communities to understand and address their TE needs. Because this is still an emerging area of discussion, utility efforts should improve as EVs become more widespread and affordable.

States and utility commissions should continue to promote equitable access to charging infrastructure if they are not already doing so. Our key recommendations include the following:

- Direct regulated utilities to submit TE plans that address equity and multiple use cases for EVSE
- Develop state-wide criteria that include definitions of need beyond income (e.g., pollution burden, community economic condition, tribal status, etc.)
- Develop state-wide metrics of success to allow for easier evaluation and peer-to-peer learning
- Set minimum levels of funding for underserved communities for utility investments and greater rebate levels for underserved community recipients

Utilities should think comprehensively about their TE plans and programs and engage more fully with the communities they serve. Our key recommendations here include the following:

- Set aside funding for LMI and underserved communities if you are not already doing so
- When investing, think beyond income and use TE investments to address broader pollution and economic issues
    - This can include investing in medium- and heavy-duty vehicles and fleets operating in EJ communities, supporting electric ridesharing and car sharing, and increasing mobility in LMI communities
- Initiate community engagement early in the planning process, including problem identification and goal setting, and work toward building trust among community members through continued and meaningful engagement

- Center community needs in planning decisions and adapt plans based on community feedback about TE needs

TE is still in its early stages, and there will be considerable change over the next decade or two. States, utility commissions, and utilities themselves should continue to learn from each other and improve their efforts. Equity should take a front seat in this transformation to rectify the wrongs of past transportation planning.

References

AAA (American Automobile Association). 2019. *Consumer Attitudes—Electric Vehicles.* Heathrow, FL: AAA. publicaffairsresources.aaa.biz/download/14035/.

———. 2020. *Electric Vehicle Ownership: Cost, Attitudes and Behaviors.* Heathrow, FL: AAA. publicaffairsresources.aaa.biz/download/16344/.

ACC (Arizona Corporation Commission). 2019. *Electric Vehicle Policy Implementation Plan.* Docket No. RU-00000A-18-0284. Phoenix: ACC. edocket.azcc.gov/search/docket-search/item-detail/21658.

ACEEE. 2020. "Supporting Low-Income Energy Efficiency: A Guide for Utility Regulators." www.aceee.org/toolkit/2020/02/supporting-low-income-energy-efficiency-guide-utility-regulators.

AEE (Advanced Energy Economy). 2019. *Electrifying Medium- and Heavy-Duty Vehicles*. Washington, DC: AEE. info.aee.net/electrifying-medium-heavy-duty-electric-vehicles-mdv-hdv-operational-cost-fact-sheet.

AFDC (Alternative Fuels Data Center). 2020. "Alternative Fueling Station Counts by State." afdc.energy.gov/stations/states.

Allen, P., G. Van Horn, M. Goetz, J. Bradbury, and K. Zyla. 2017. *Utility Investment in Electric Vehicle Charging Infrastructure: Key Regulatory Considerations.* Washington, DC: MJB&A (M.J. Bradley & Associates, LLC) and Georgetown Climate Center. www.georgetownclimate.org/files/report/GCC-MJBA_Utility-Investment-in-EV-Charging-Infrastructure.pdf.

Bael, D., and J. Sample. 2015. *Life and Breath: How Air Pollution Affects Public Health in the Twin Cities.* St. Paul: Minnesota Pollution Control Agency and Minnesota Department of Health. www.pca.state.mn.us/sites/default/files/aq1-61.pdf.

Baldwin, S., A. Myers, and M. O'Boyle. 2020. *Increasing Electric Vehicle Charging Access at Multi-Unit Dwellings: Workshop Summary Report*. San Francisco: Energy Innovation. energyinnovation.org/wp-content/uploads/2020/09/Increasing-Electric-Vehicle-Charging-at-Multi-Unit-Dwellings.pdf.

Borgeson, M., and M. Baumhefner. 2020. "Newsom Signs Law to Clean Air Inside and Out of School." *NRDC Expert Blog,* October 1. www.nrdc.org/experts/max-baumhefner/california-adopts-bill-clean-air-inside-and-out-school.

BlueLA. 2020. "About BlueLA." www.bluela.com/.

Bolduc, A., M. Von Weihe, J. Smith, S. Dise, M. Alam, E. Myers, R. Haynes, and P. Toporkov. 2020. *Utility Best Practices for EV Infrastructure Deployment.* Washington, DC: SEPA (Smart Electric Power Alliance). sepapower.org/resource/best-practices-for-utility-ev-infrastructure-deployment/.

C2ES (Center for Climate and Energy Solutions). 2019. *U.S. State Clean Vehicle Policies and Incentives.* Arlington, VA: C2ES. www.c2es.org/document/us-state-clean-vehicle-policies-and-incentives/.

CarMax. 2017. "2017 Hybrid & Electric Cars Survey Results." *CarMax Trends,* July 18. www.carmax.com/articles/hybrid-electric-2017-survey-results.

CEC (California Energy Commission). 2018. *Transcript of Joint Agency Workshop: SB 350 Equity Milestones and Implementation Progress*. Docket No. 18-IEPR-08, August 29. Sacramento: CEC. efiling.energy.ca.gov/GetDocument.aspx?tn=224914&DocumentContentId=55510.

Clark, H. 2017. *Who Rides Public Transportation.* Washington, DC: APTA (American Public Transportation Association). www.apta.com/wp-content/uploads/Resources/resources/reportsandpublications/Documents/APTA-Who-Rides-Public-Transportation-2017.pdf.

Colorado General Assembly. 2019. *An Act Concerning Electric Motor Vehicles Public Utility Services, SB19-077*. Denver: Colorado General Assembly. leg.colorado.gov/sites/default/files/2019a_077_signed.pdf.

Colorado PUC (Public Utilities Commission). 2020. *In the Matter of The Application of Public Service Company of Colorado for Approval of Its 2021–2023 Transportation Electrification Plan.* Proceeding No. 20A-0204E, Decision No. C21-0017, December 23. Denver: Colorado PUC. www.xcelenergy.com/staticfiles/xe-responsive/Company/Rates%20&%20Regulations/Regulatory%20Filings/final-decision-TEP.pdf.

Congressional Black Caucus Foundation. 2015. *Minority Access to Capital and Employment*. Washington, DC: Congressional Black Caucus Foundation. www.cbcfinc.org/wp-content/uploads/2016/01/CBCF_MinorityAccessCapital_FactSheet_final.pdf.

Cooper, A., and K. Schefter. 2018. *Electric Vehicle Sales Forecast and the Charging Infrastructure Required through 2030.* Washington, DC: IEI (Institute for Electrical Innovation), EEI (Edison Electric Institute). www.ehcar.net/library/rapport/rapport233.pdf.

Cournoyer, C. 2018. "More Poorer Residents Are Driving Cars, Presenting New Issues for Transit Agencies." *Governing,* April 9. www.governing.com/topics/transportation-infrastructure/gov-car-ownership-poverty.html.

CPUC (California Public Utilities Commission). 2020a. "Disadvantaged Communities." www.cpuc.ca.gov/discom/.

———. 2020b. *Transportation Electrification Framework: Energy Division Staff Proposal.* San Francisco: CPUC. www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442463904.

Creger, H., J. Espino, and A. Sanchez. 2018. *Mobility Equity Framework: How to Make Transportation Work for People.* Oakland: The Greenlining Institute. greenlining.org/publications/2018/mobility-equity-framework/.

CUB (Citizens Utility Board). 2020. *EV for All: Electrifying Transportation in Low-Income Communities.* Chicago: CUB. www.citizensutilityboard.org/wp-content/uploads/2020/06/EV-for-All.pdf.

Drive Electric Florida. 2012. *Getting Apartments and Condos Ready for Plug-in Electric Vehicle Charging*. Juno Beach: Florida Power and Light. www.driveelectricflorida.org/PDFs/multiunit.pdf.

Energy Innovations. 2020. "Energy Policy Simulator." us.energypolicy.solutions/scenarios/home.

EPA (Environmental Protection Agency). 2020. "Fast Facts on Transportation Greenhouse Gas Emissions." www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions.

EV Hub. 2020a. "Electric Utility Filings." Accessed August. www.atlasevhub.com/materials/electric-utility-filings/.

———. 2020b. "Laws & Regulations." Accessed September. www.atlasevhub.com/materials/laws-regulations-and-legislation/.

———. 2020c. "National EV Sales." Accessed September. www.atlasevhub.com/materials/national-ev-sales/.

Farkas, Z., H. Shin, and A. Nickkar. 2018. *Environmental Attributes of Electric Vehicle Ownership and Commuting Behavior in Maryland: Public Policy and Equity Considerations.* Charlottesville: MATS UTC (Mid-Atlantic Transportation Sustainability University Transportation Center), University of Virginia. www.morgan.edu/Documents/ACADEMICS/CENTERS/NTC/Environmental%20Attributes%20of%20Electric%20Vehicle%20Ownership%20and%20Commuting%20Behavior%20in%20Maryland%20-%20Public%20Policy%20and%20Equity%20Considera.pdf.

George, S. 2018. *Electrifying the Ride-Sourcing Sector in California: Assessing the Opportunity*. San Francisco: CPUC. www.readkong.com/page/electrifying-the-ride-sourcing-sector-in-california-3344269.

González, R. 2019. *The Spectrum of Community Engagement to Ownership.* Oakland: Facilitating Power. movementstrategy.org/b/wp-content/uploads/2019/09/Spectrum-2-1-1.pdf.

Greenlining Institute. 2019. *Making Equity Real in Mobility Pilots.* Oakland: The Greenlining Institute. greenlining.org/publications/reports/2019/making-equity-real-in-mobility-pilots-toolkit/.

Grid Alternatives. 2021. "One-Stop-Shop Pilot." gridalternatives.org/what-we-do/access-electric-vehicles/one-stop-shop.

Hagerty, M., S. Sergici, and L. Lam. 2020. *Getting to 20 Million EVs by 2030: Opportunities for the Electricity Industry in Preparing for an EV Future.* Boston: The Brattle Group. brattlefiles.blob.core.windows.net/files/19421_brattle_-_opportunities_for_the_electricity_industry_in_ev_transition_-_final.pdf.

Harto, C. 2020. *Electric Vehicle Ownership Costs: Today's Electric Vehicles Offer Big Savings for Consumers.* Yonkers: Consumer Reports. advocacy.consumerreports.org/wp-content/uploads/2020/10/EV-Ownership-Cost-Final-Report-1.pdf.

Hawkins, J. 2020. "Uber Pledges to Shift to '100 Percent' Electric Vehicles by 2030." *The Verge,* September 8. www.theverge.com/2020/9/8/21427196/uber-promise-100-percent-electric-vehicle-ev-2030?gsBNFDNDN=undefined.

Houston, S. 2019. *Electric Utility Investment in Truck and Bus Charging: A Guide for Programs to Accelerate Electrification.* Cambridge, MA: UCS (Union of Concerned Scientists). www.ucsusa.org/sites/default/files/attach/2019/04/Electric-Utility-Investment-Truck-Bus-Charging.pdf.

Huntington, A., and J. Culkin. 2020. *Electric Utility EV Program Implementation Survey*. MJ Bradley & Associates. www.mjbradley.com/reports/electric-utility-electric-vehicle-program-implementation-survey.

Katz, C. 2012. "People in Poor Neighborhoods Breathe More Hazardous Particles." *Scientific American,* November 1. www.scientificamerican.com/article/people-poor-neighborhoods-breate-more-hazardous-particles/.

King County Metro. 2020. *Battery-Electric Bus Implementation Report: Interim Base and Beyond.* Seattle: King County Metro. kingcounty.gov/~/media/depts/metro/programs-projects/zero-emissions-fleet/battery-electric-bus-implementation-report.pdf.

Koewler, M., S. Fazeli, C. Powers, R. González, and M. Gransee. 2020. *Designing Equity-Focused Stakeholder Engagement to Inform State Energy Office Programs and Policies.* Arlington, VA: NASEO (National Association of State Energy Officials). www.naseo.org/data/sites/1/documents/publications/13-0376_0549_000208-KOEWLER%20FINAL%20cover.pdf.

Lutsey, N., and M. Nicholas. 2019. *Update on Electric Vehicle Costs in the United State through 2030.* Washington, DC: ICCT (International Council on Clean Transportation). theicct.org/sites/default/files/publications/EV_cost_2020_2030_20190401.pdf.

Lyft. 2020a. "Leading the Transition to Zero Emissions: Our Commitment to 100% Electric Vehicles by 2030." *Lyft Blog*, June 17. www.lyft.com/blog/posts/leading-the-transition-to-zero-emissions.

———. 2020b. "National Statistics." www.lyft.com/impact/economic-impact-report.

Maciag, M. 2014. "Public Transportation's Demographic Divide." *Governing,* February 25. www.governing.com/topics/transportation-infrastructure/gov-public-transportation-riders-demographic-divide-for-cities.html.

Miranda, M., S. Edwards, M. Keating, and C. Paul. 2011. "Making the Environmental Justice Grade: The Relative Burden of Air Pollution Exposure in the United States." *International Journal of Environmental Research and Public Health* 8 (6): 1755–71. doi.org/10.3390/ijerph8061755.

Morris, J., and M. Farmer. 2019 "Unpacking New York's Big New Climate Bill: A Primer." *NRDC Expert Blog,* June 20. www.nrdc.org/experts/miles-farmer/unpacking-new-yorks-big-new-climate-bill-primer-0.

Nadel, S. 2020. "Electric Truck Fleets Will Need a Lot of Power, but Many Utilities Aren't Planning for It." *ACEEE Blog*, July 23. www.aceee.org/blog-post/2020/07/electric-truck-fleets-will-need-lot-power-many-utilities-arent-planning-it.

Nadel, S., and E. Junga. 2020. *Electrifying Trucks: From Delivery Vans to Buses to 18-Wheelers.* Washington, DC: ACEEE. www.aceee.org/sites/default/files/pdfs/electric_trucks_1.pdf.

New Mexico Legislature. 2019. *PRC Application for Vehicle Electricity, HB 521*. Santa Fe: New Mexico Legislature. nmlegis.gov/Legislation/Legislation?Chamber=H&LegType=B&LegNo=521&year=19.

New York DPS (Department of Public Service). 2020. *Proceeding on Motion of the Commission Regarding Electric Vehicle Supply Equipment and Infrastructure.* Matter No. 18-00561, Case No. 18-E-0138. Albany: New York DPS. documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?Mattercaseno=18-E-0138.

NMHC (National Multifamily Housing Council). 2020. "Quick Facts: Resident Demographics." www.nmhc.org/research-insight/quick-facts-figures/quick-facts-resident-demographics/.

O'Kane, S. 2020. "15 States Will Follow California's Push to Electrify Trucks and Buses." *The Verge,* July 14. www.theverge.com/2020/7/14/21324552/electric-trucks-buses-clean-air-zero-emissions-states.

Oregon PUC (Public Utility Commission). 2019. *Rulemaking Regarding Transportation Electrification Plans.* Order No. 19-134, April 16. Salem: Oregon PUC. apps.puc.state.or.us/orders/2019ords/19-134.pdf.

Orenstein, W. 2020. "Electric Vehicle Chargers Are Scarce in Twin Cities Apartment and Condo Buildings. That May Be Starting to Change." *MinnPost,* January 8. www.minnpost.com/environment/2020/01/electric-vehicle-chargers-are-scarce-in-twin-cities-apartment-and-condo-buildings-that-may-be-starting-to-change/.

Patterson, R. 2020. *New Routes to Equity: The Future of Transportation in the Black Community*. Washington, DC: Congressional Black Caucus Foundation. www.cbcfinc.org/publication/new-routes-to-equity-the-future-of-transportation-in-the-black-community/.

Pierce, G., J. Deshazo, T. Sheldon, B. McOmber, and E. Blumenberg. 2019. *Designing Light-Duty Vehicle Incentives for Low- and Moderate-Income Households.* Prepared by Luskin Center for Innovation, University of California, Los Angeles. Sacramento: CARB (California Air Resources Board). innovation.luskin.ucla.edu/wp-content/uploads/2019/06/Designing_Light-Duty_Vehicle_Incentives_for_Low-and_Moderate_Income_Households.pdf.

Povich, E. 2020. "Got an Electric Car? Great! Where Do You Plug It In?" *Stateline,* January 2. www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2020/01/02/got-an-electric-car-great-where-do-you-plug-it-in.

Reichmuth, D. 2020. "Are Electric Vehicles Really Better for the Climate? Yes. Here's Why." *Union of Concerned Scientists Blog,* February 11. blog.ucsusa.org/dave-reichmuth/are-electric-vehicles-really-better-for-the-climate-yes-heres-why.

Relf, G., E. Cooper, R. Gold, A. Goyal, and C. Waters. 2020. *2020 Utility Energy Efficiency Scorecard.* Washington, DC: ACEEE. www.aceee.org/sites/default/files/pdfs/u2004%20rev_0.pdf.

Richardson, B. 2019. "It Pays to Be Green: Homes Near Electric-Vehicle Charging Stations Fetch Top Dollar." *Forbes,* April 21. www.forbes.com/sites/brendarichardson/2019/04/21/it-pays-to-be-green-homes-near-electric-vehicle-charging-stations-fetch-top-dollar/#bc7c19c418bc.

Roberts, D. 2018. "Electric Buses Are Coming, and They're Going to Help Fix 4 Big Urban Problems." *Vox,* April 28. www.vox.com/energy-and-environment/2017/10/24/16519364/electric-buses.

Sclar, R., and E. Werthmann. 2019. "The $6,000 Electric Vehicle: The Power of the Used Car Market to Bring Electric Vehicles to Everyone." *World Resources Institute Blog*, August 12. www.wri.org/blog/2019/08/6000-electric-vehicle-power-used-car-market-bring-electric-vehicles-everyone.

Seattle City Light. 2020. *Transportation Electrification Strategic Investment Plan.* Seattle: Seattle City Light. cospowerlines-wpengine.netdna-ssl.com/wp-content/uploads/2020/09/SCL-Transportation-Electrification-Strategic-Investment-Plan-2021-2024-w-attachments.pdf.

Smith, C. 2020. "Nearly 80 Percent of VW Funds Remain Two Years after the First Awards." *EV Hub,* July 10. www.atlasevhub.com/data_story/nearly-80-percent-of-vw-funds-remain-two-years-after-the-first-awards/.

———. 2021. "Xcel Energy Investing $110 million in Transportation Electrification in Colorado." *EV Hub,* January 19. www.atlasevhub.com/weekly_digest/xcel-energy-investing-110-million-in-transportation-electrification-in-colorado/.

Spieler, C. 2020. "Racism Has Shaped Public Transit, and It's Riddled with Inequities." *Urban Edge Blog*, August 24. kinder.rice.edu/urbanedge/2020/08/24/transportation-racism-has-shaped-public-transit-america-inequalities.

Traut, E., T. Cherng, C. Hendrickson, and K. Michalek. 2013. "US Residential Charging Potential for Electric Vehicles." *Transportation Research Part D* 25: 139–45. www.cmu.edu/me/ddl/publications/2013-TRD-Traut-etal-Residential-EV-Charging.pdf.

Turrentine, J. 2019. "A Roadmap for Frontline Communities." *NRDC,* December 15. www.nrdc.org/stories/roadmap-frontline-communities.

Valentine, A. 2020. "'The Wrong Complexion for Protection.' How Race Shaped America's Roadways and Cities." *NPR,* July 5. www.npr.org/2020/07/05/887386869/how-transportation-racism-shaped-america.

Welch, D. 2017. *Electrified Transportation for All: How Electrified Transportation Can Benefit Low-Income Communities.* Arlington, VA: C2ES. www.c2es.org/document/electrified-transportation-for-all-how-electrified-transportation-can-benefit-low-income-communities/.