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HOUSE OF REPRESENTATIVES
COMMONWEALTH *of* PENNSYLVANIA

House Democratic Policy Committee Hearing

Electric Vehicle Charging Stations

Monday, June 6, 2022 | 1:00 p.m.

Representative Mary Jo Daley

OPENING REMARKS

1:00p.m.	Rep. Mary Jo Daley, D-Montgomery
PANEL ONE	
1:05p.m.	Natasha Fackler, Infrastructure Implementation Coordinator *Pennsylvania Dept. of Transportation*
PANEL TWO	
1:30p.m.	Anthony Bandiero, Executive Director *Eastern PA Alliance for Clean Transportation*
	Richard Price, Executive Director *Pittsburgh Region Clean Cities*
PANEL THREE	
2:00p.m.	Chris Sandvig, Executive Director *Mobilify Southwestern Pennsylvania*
PANEL FOUR	
2:30p.m.	Iggy Fletcher, Apprentice Training School Instructor *IBEW Local 98*

Remarks and Testimony can be found by scanning the QR Code below:

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

Testimony of
Natasha Fackler, PennDOT Infrastructure Implementation Coordinator
Pennsylvania Department of Transportation
Public Hearing on Electric Vehicles
House Democratic Policy Committee
June 6, 2022

Good afternoon. My name is Natasha Fackler and I am the Infrastructure Implementation Coordinator for PennDOT. Thank you for the opportunity to speak with you today about PennDOT's work in support of vehicle electrification in Pennsylvania.

Over the past three years, electric vehicle (EV) registrations in Pennsylvania have more than doubled, from 9,700 registered EVs in 2019, to more than 23,000 registered EVs currently. There are over 2,700 public EV chargers (plug count) available at more than 1,100 locations across the commonwealth. The auto industry has made it clear that electrification is a priority. Manufacturers are in over-drive to push electric vehicles to market and plan on spending 225 billion dollars in developing new electric vehicles.

General Motors announced that they will go all electric by 2035 and Ford announced 40 percent of its vehicles will be electrified by 2030. This will continue to be a trend in the industry. Additionally, according to the Society of American Engineers, the number of electric heavy-duty trucks in the U.S., Canada, China and Europe is expected to increase nearly 80 percent by 2023. Additionally, Amazon has announced that they will purchase 100,000 all electric "first and last mile" vehicles over the next 5 years with the first 20,000 being purchased this year.

The rate of EV adoption will continue to increase annually, and it is critical that Pennsylvania wisely invests new federal funds to meet this growing demand and facilitate additional investments in infrastructure from our private sector partners across the commonwealth.

As you know, on November 15, 2021, President Biden signed the Bipartisan Infrastructure Law (BIL). The BIL provides up to $7.5 billion in dedicated funding to help make EV chargers accessible to all Americans for local and long-distance trips. The overarching goals of this funding are to increase range confidence of EV users, and provide a seamless customer experience for EV charging, by establishing a convenient, reliable, affordable, and equitable national EV charging network.

The National Electric Vehicle Infrastructure (NEVI) Formula Program was allocated $5 billion of these funds. Pennsylvania expects to receive $171.5 million over five years, $25.4 million in FFY 2022. The NEVI Formula Program provides dedicated funding to states to strategically

deploy EV charging infrastructure and establish an interconnected network to facilitate data collection, access, and reliability.

The remaining $2.5 billion in BIL EV funds is allocated to the Discretionary Grant Program for Charging and Fueling Infrastructure, which is further divided into two $1.25 billion grant programs to support EV charger deployment.

The Corridor Charging Grant Program will strategically deploy publicly accessible EV charging infrastructure and hydrogen, propane, and natural gas fueling infrastructure along designated Alternative Fuel Corridors; and the Community Charging Grant Program will strategically deploy publicly accessible EV charging infrastructure and hydrogen, propane, and natural gas fueling infrastructure in communities.

Initially, with the goal of facilitating long-distance travel, NEVI funding must be invested in the installation of EV fast-charging stations along designated Alternative Fuel Corridors (AFCs). For context, an EV fast-charging station can provide approximately 100 miles of range per 30 minutes of charging, compared to 14-35 miles of range per hour for a level 2 charger, and 3.5-6.5 miles of range per hour for a level 1 charger. The Alternative Fuel Corridor Program is designed to expand the nation's alternative fueling network for electric, hydrogen, propane, and natural gas vehicles.

Since 2016, PennDOT has nominated EV corridors in all five rounds of the FHWA program. Currently, all interstates and portions of US 30 and US 15 are designated EV corridors with a total of over 1700 miles of designated EV Alternative Fuel Corridors. Round 6 nominations were submitted to FHWA on May 13, and PennDOT nominated two additional EV corridors for consideration, including portions of Route 1 from Philadelphia to the Maryland border and portions of Route 422 from Philadelphia to Hershey.

Once the Alternative Fuel Corridors are fully built out, funding may be used on any public road or in other publicly accessible locations.

To have access to the NEVI funding, states must prepare and submit a NEVI State Plan to the federal government no later than August 1, 2022, that highlights how the state’s share of the funding will be utilized. We are hard at work preparing this plan.

As part of the plan development, the NEVI guidance requires states to conduct stakeholder outreach. To date, PennDOT has hosted 12 webinars for interested stakeholders, the general public and legislators. Additionally, PennDOT has held over 40 one-on-one meetings with EVSE charging infrastructure companies, utilities and potential site hosts and presented at over a dozen other meetings. It is critical that Pennsylvania is positioned to receive and apply for all available EV federal funding opportunities and to assist communities and local partners to be successful for an effective and efficient rollout of EV initiatives.

Additionally, PennDOT has established an EV Interagency Task Force to help facilitate coordination among Commonwealth agencies on EV issues. The kickoff meeting was held in January 2022, and included Department of Environmental Protection (DEP), Department of

Conservation and Natural Resources (DCNR), Department of Community and Economic Development (DCED), Department of Education (PDE), Department of General Services (DGS), Department of Agriculture, Pennsylvania Emergency Management Agency (PEMA), and Pennsylvania Utilities Commission (PUC). PennDOT has also established an internal EV Senior Advisory Council, a cross-departmental team to answer questions, identify priorities, and complete action items relating to three focus areas: Outreach & Education; PennDOT's EV Fleet; and EV Deployments. Our efforts are well underway for transitioning 25 percent of our fleet passenger vehicles to electric and plug-in hybrid by 2025 and installing the needed charging infrastructure to support the fleet statewide.

There is also a great deal of work underway to ensure equity considerations are a key component of our planning for increased vehicle electrification. To ensure that everyone receives the benefits of electrification, including underserved and underrepresented communities hit hardest by climate change, PennDOT developed EV Equity Principles to guide all our planning efforts in this space. The 18 principles cover several key goals, including prioritizing investments in traditionally underserved and vulnerable population areas, EV affordability, accessibility of EV charging, and ensuring that all communities have the opportunity to learn about EV's. The EV Equity Principles are available to download on PennDOT's website.

Prior to the announcement of the NEVI Formula Program, PennDOT began working on a statewide Electric Vehicle Mobility Plan, building on the Department of Environmental Protection's (DEP) Electric Vehicle Roadmap, which was published in 2019 and updated in 2021. The EV Mobility plan will provide a comprehensive evaluation of the current state of transportation electrification in Pennsylvania, identify mobility challenges experienced by EV owners, and identify key opportunities for expansion of EV charging infrastructure, specifically related to commuter, destination and emergency travel needs. The plan is anticipated to be completed this summer.

Additionally, in July 2019, the Federal Highway Administration (FHWA) announced an applied research funding opportunity to assist with planning and development of alternative vehicle fueling and charging infrastructure along interstate corridors. Pennsylvania was selected by FHWA to participate in two of the five Alternative Fuel Deployment plan projects to establish EV charging infrastructure along I-80 and I-78/I-81 corridors. This project has looked at these corridors comprehensively to determine gaps in the spacing of various fuel alternative technologies, including EV charging. Considering that charging an EV can take 30 minutes or more, the evaluation is also considering amenities such as dining, retail and convenience shopping which would be of interest to travelers. In June 2021, PennDOT completed an FHWA Alternative Fuels Corridor Deployment Plan Report for DC fast charging infrastructure along the I-78/I-81 corridor. The current NEVI work will build on work started under this program.

There is no question that the dramatic shift toward electric vehicles is well underway and is great for our climate as well as safety, as automation becomes more integrated. However, we cannot discuss the increased adoption of electric vehicles without discussing the fact that Pennsylvania is dependent on state and federal gas taxes for 78 percent of its highway and bridge funding. We must support this new electric future and modernize our funding structure, so our transportation network gets the support it needs to keep Pennsylvanians moving.

Increased adoption of EVs, and the electrification of the transportation industry more broadly, offer significant benefits to Pennsylvania's environment, economy, and quality of life, but there is a lot of work to be done to ensure we capitalize on all the opportunities available to us.

EV's produce no direct greenhouse gas emissions and have three-times lower life-cycle emissions than non-electric vehicles when accounting for vehicle production and fuel consumption. They significantly reduce air and noise pollution, which will contribute to improved health outcomes and quality of life, especially for communities located near high-traffic roadways.

The transition to electric vehicles will support Pennsylvania's economy by saving consumers money on both fuel and life-cycle maintenance costs, and electricity rates paid to utilities and generation companies stay within the local economy and contribute to the nation's energy independence. The increased production and installation of EVs and EV charging infrastructure will create good-paying jobs in clean energy industries, and across various sectors of the economy such as research, raw materials extraction, manufacturing, technology, maintenance and services, and other supporting industries.

Technology and innovation, coupled with the new federal funds in the BIL, provide us with an incredible opportunity to reinvent transportation in a way that is smarter, cleaner, safer, more equitable and more efficient than ever before. PennDOT is committed to providing EV awareness, education, and technical capacity to our partners, especially to support EV industry job skills, local small business development and educational opportunities for all job-levels.

Drive Electric Pennsylvania Coalition

Testimony of Tony Bandiero and Rick Price
Executive Directors of Eastern Pennsylvania Alliance for Clean Transportation &
Pittsburgh Region Clean Cities, respectively
Public Hearing on Electric Vehicles
House Democratic Policy Committee
June 6, 2022

Good afternoon, my name is Tony Bandiero, and I am the Executive Director at the Eastern Pennsylvania Alliance for Clean Transportation (EP-ACT). This testimony will be representation from both EP-ACT and the Pittsburgh Region Clean Cities (PRCC) of which Mr. Rick Price is the Executive Director. Both our organizations are 501 (c) 3 Non-profits. Together our organizations cover the entire Commonwealth of Pennsylvania for the Department of Energy's Clean Cities Program. The Clean Cities Program was founded in 1993 by the Department of Energy, in response to the Energy Policy Act of 1992, where as DOE created Clean Cities to provide informational, technical, and financial resources to EPAct-regulated fleets and voluntary adopters of alternative fuels and vehicles. Since that time there are more than seventy-five coalitions across the country, each one tasked to displace petroleum within the transportation sector.

Clean Cities coalitions are comprised of businesses, fuel providers, vehicle fleets, state and local government agencies, utilities, colleges and Universities, and community organizations. Each coalition is led by an on-the-ground Clean Cities Director who tailors projects and activities to capitalize on the unique opportunities within their communities. Nationwide, more than 20,000 stakeholders participate in Clean Cities coalitions, and through our collective efforts we are transforming local and regional transportation markets.

Our collective efforts in Pennsylvania, have recorded over an eighteen million Gas Gallon Equivalent (GGE) displaced in 2021 alone, throughout our stakeholder members. As a national organization we have displaced over 2 Billon GGE last year. We support alternatives to gasoline and diesel and utilize various alternative fuels and technologies to reduce petroleum consumption within the transportation industry. This includes electricity.

Our organizations have been on the forefront of promoting electric vehicles since our inception. We regularly hold over ten meetings a year concerning the electric vehicle industry, from EV 101 workshops to Electric School Bus workshops including Electric Vehicle Supply Equipment (EVSE's) (charging stations) educational sessions. We have also been instrumental in helping fleets and site owners install EVSE's. We are involved in many EV projects including *Drive Electric Pennsylvania* which is a project that has partners in over 15 other states, and a new project titled "*Charge to Work USA*" where we will help implement charging stations at places of work throughout Pennsylvania.

We have been working with state agencies, including the Department of Environmental Protection, Department of Transportation and Department of Conservation and Natural Resources, since 2010 to spur adoption of electric vehicles. Our work includes the formation of the Drive Electric Pennsylvania Coalition which is an organization of like minded groups including both public and private businesses, local and state governments, and industry partners with the common goal of EV adoption. The inner working of this coalition has helped produce a Pennsylvania EV Roadmap, a comprehensive guide to best practices and ideas that will help move the needle toward an Electric Vehicle acceptance throughout PA.

Being part of a Federal sponsored program, we are close to the federal policies put forth from the current federal administration. The Bi-Partisan Infrastructure Law (BIL) provides up to $7.5 billion in dedicated funding to help build out EV infrastructure throughout the country. As a direct result of this law the Federal government has formed a new office called the Joint Office of Energy and Transportation, which is responsible for implementing and funding each state's National Electric Vehicle Infrastructure (NEVI) Plan. Pennsylvania is slated to receive over $25 million a year until 2026 to help build out DC Fast Charging networks along Pennsylvania's designated Alternative Fuel Corridors. There are many detailed criteria for these funds to be used, including distance from the designated corridor, 50 miles maximum between the charging stations and power requirements, amongst others.

This funding is also set to make sure that Environmental Justice areas are served. This includes low-income, disadvantaged communities, non-attainment areas and rural communities. The program titled Justice40 Initiative states that at least 40% of this funding needs to be spent in those communities. We feel that this is an area where the two Clean Cities Coalitions in PA may be able to help by disseminating information, hosting workshops and discussions in those areas that will help these normally underserved communities with new industries that can help stimulate the economy and create jobs within those areas.

Our coalitions have been working directly with PennDOT to help get the interstates and other main arterial roadways designated as alternative fuel corridors from the Federal Highway Administration. Currently ALL the Interstates in Pennsylvania are designated as alternative fuel corridors for both EV's and natural gas (CNG) vehicles. According to data collected on the Alternative Fuel Data Center, there are currently 573 plugs in PA, this includes the Tesla charging network which is a proprietary network. It is estimated that 4,300 DCFC's are needed for a fully functioning electric vehicle economy in Pennsylvania. Once the designated corridors have been fully built out (meeting requirements) the federal NEVI money can be used to help fill in the gaps along ancillary roadways and in communities that would meet the environmental justice guidelines.

The Clean Cities of Pennsylvania have been helping stakeholders in our organizations with many facets of Electric Vehicles. Together we have helped businesses and municipalities install over 100 public charging units, including getting funding for the 1st

public charging station built in Philadelphia in 2011. We have helped get over 200 EV's on the road within fleets and have done numerous EV workshops including 1st Responder Trainings, an area which is much needed in the advent of this new fuel in transportation. We believe that EV's are the key to helping Pennsylvania with economic development, environmental stewardship and energy security. Now more than ever, the cost of fuel is making some travel prohibitive and is also adding to the current inflation in the economy. Electricity can be produced within our Commonwealth and produced using sustainable resources including wind, solar and renewable energy types as well as natural gas which are abundant throughout Pennsylvania.

It is our intension to help state, county and municipalities as well as all business categories with their entrance and conversion to using electricity to replace petroleum within the transportation sector. Transportation accounts for 70% of our Green House Gas Emissions (GHG). Electric Vehicles emit NO tailpipe emissions. Using domestically produced or even Pennsylvania produced fuel will not only help our environment but can help spur economic growth.

Our history demonstrates our ability to cross business sectors with a common goal of displacing petroleum in vehicles. Our work and our connections to federal, state, county and municipalities allow us to be the conduit for projects, workshops and information resources needed to help The Commonwealth with its conversion to electric vehicles.

Thank you for your time.

mobilify
SOUTHWESTERN PENNSYLVANIA

218 Oakland Ave.
Pittsburgh, PA 15213

June 6, 2022

Ref: EV Infrastructure Testimony to PA House Democratic Policy Committee

Representatives Bizarro, Fiedler, Ciresi, Davis, Isaacson, Schweyer, and Daley;
Thank you for inviting me to speak to you today regarding electric vehicle (EV) charging infrastructure within the Commonwealth of Pennsylvania.

My name is Chris Sandvig, and I am the Executive Director of Mobilify Southwestern Pennsylvania. Mobilify works towards securing greater, cleaner multimodal transportation choices, equitable transportation access, and economic opportunity across our region. We are an advocacy organization that also provides education and technical assistance to communities, policymakers, the private sector, and public officials on mobility issues. We connect, coordinate, and collaborate with regional stakeholders to identify promising, high-priority projects and advance them towards implementation. Though Mobilify is only 18 months old, I have been working in this space since 2009.

Transportation's impact on our environment – particularly through the lenses of environmental justice and community development - has been an increasingly important part of our work. I chair a statewide Clean Transportation Table, which is consists of over sixty stakeholders ranging from environmental and transit activists and advocates to regional planning officials and EV OEMs. Vehicle electrification holds many promises for our planet, our Commonwealth, our municipalities, and our communities – especially the most vulnerable neighbors. The positive impacts for the environment, as well as air quality in our densest regions cannot be understated. I will focus on the following points today:

1) The time to get EV-ready is now;
2) We must maximize the federal infrastructure law's options but do more;
3) Environmental justice must be at the center of our efforts, and the disproportionate focus on single-occupancy vehicle (SOV) electrification misses the mark;
4) Community engagement, especially with EJ communities and our most vulnerable neighbors, must go beyond the typical approach taken in transportation planning and construction;
5) How we collect funds for our transportation system, and how we use them, must change to reflect the new reality, and;
6) We cannot combat the climate crisis by continuing SOV-fixated funding policies.

The time to get EV ready is now and we should not get distracted.

As you may be aware, nearly every major automaker has committed to a 100%-electric fleet by the end of this decade. This is not just lip service; the transitions are happening now. Further, with the ever-increasing cost of gas, EVs are being bought faster than they can be built. Through the federal Infrastructure Investment and Jobs Act (IIJA) billions of dollars are now available to deploy EV infrastructure and purchase EVs. One program alone –National Electric Vehicle Infrastructure (NEVI) directs $171 million to PAA over 5 years specifically for EV infrastructure deployment. There are other

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new programs, and retooling of exiting ones, that IIJA introduced that can also be used for EV infrastructure, as shown in Figure 1 below:

	FY 2022[1] AMOUNT						
FORMULA PROGRAMS							
National Highway Performance Program (NHPP)	$28.4 B[2]						
Surface Transportation Block Grant Program (STBG)	$12.5 B[2,3]						
Congestion Mitigation & Air Quality Improvement Program (CMAQ)	$2.5 B[2]						
National Highway Freight Program (NHFP)	$1.4 B[2]						
State Planning and Research (SPR)	$983.3 M[4]						
Metropolitan Planning (PL)	$438.1 M[2]						
Carbon Reduction Program	$1.2 B[2,5]						
National Electric Vehicle (NEVI) Formula Program	$685 M[2,5,6]						
DISCRETIONARY PROGRAMS							
Rebuilding American Infrastructure with Sustainability and Equity (RAISE) (formerly known as BUILD)	$1.5 B						
Infrastructure for Rebuilding America (INFRA) Grant Program	$1.64 B[2,7]						
Advanced Transportation and Technologies and Innovative Mobility Deployment	$60 M[2]						
Discretionary Grant Program for Charging and Fueling Infrastructure	$300 M[2,5]						
Rural Surface Transportation Grant Program	$300 M[2,5]						
Reduction of Truck Emissions at Port Facilities Program	$80 M[2,5,7]						
OTHER ALLOCATED PROGRAMS							
Federal Lands and Tribal Transportation Program (FLTTP)	$1.3 B[2,8]						
Puerto Rico Highway Program (PRHP)	$173 M[2]						
Territorial Highway Program (THP)	$46 M[2]						
INNOVATIVE FINANCE PROGRAMS							
State Infrastructure Banks (SIBs)	Varies						
Transportation Infrastructure Financing and Innovation Act (TIFIA)	$250 M[2]						

Figure 1. USDOT Funding and Financing Programs with EV Eligibilities. Electric fuel symbol represents charging infrastructure

While Pennsylvania has not been sitting idly by, our efforts to-date have been meagre compared to many other large states. Our portion of VW settlement funds - $118.5 million - for example, have yet to underwrite even one EV program. Other "alternative fuels" continue to be pursued when, at least in the private SOV space, their corresponding vehicles will never reach mass production. Many manufacturers do not sell EVs or even plugin hybrids within this state because it is not seen as friendly to EVs. Pennsylvanians are missing out and will do so even more over the next 8 years if we do not get serious about this now. Not doing so could saddle us all with increasingly expensive vehicles and infrastructure that has less and less support from the automotive industry and its supportive services.

Maximize IIJA's opportunities and options and go beyond

IIJA is, by every measure, a landmark piece of legislation. In addition to new EV infrastructure provisions, it also sets a tone for greater multimodal investment. These funds, especially if we only focus on NEVI, are nowhere near enough to adequately feed the coming EV demand and policy reform is needed to encourage private sector deployment, which is what these funds should catalyze in the first place.

PA's motor vehicle code, utility law, and other state statutes, for example should be analyzed and revised to allow for rapid deployment of EV infrastructure across the state regardless of funding source and whether or not it is a private or public interest. This could include things such as

1. Empowering the PUC to regulate EV infrastructure construction and maintenance and set EV rate fee allowances as it would for any other distribution and billing practice;
2. Helping municipalities modify ordinances so they can be more accommodating of EV infrastructure within their borders;
3. Engaging MPOs and RPOs in the planning and engagement processes of deploying publicly provided EV infrastructure funding pools;
4. Ensuring that a certain percentage of funds in federal programs like CMAQ and Rural Surface Transportation program go towards EV infrastructure deployment;
5. Compelling the PA Infrastructure Bank and Commonwealth Financing Authority to underwrite EV infrastructure P3s;

And other opportunities.

Center environmental justice EJ in our electrification strategy and think beyond the car

One of President Biden's first Executive Orders created Justice40. This directive commits the federal government to combatting environmental and socio-economic injustices by guiding investments from covered federal programs such that disadvantaged communities receive at least 40% of their benefits. Eligible areas where EV infrastructure can play a role include clean energy and energy efficiency clean transit, training and workforce development, and remediation and reduction of legacy pollution.

Justice40 is a consideration in all federal transportation programs, but especially in vehicle electrification and public transportation. As it relates to EVs, however, three key things matter here:

1) 40% benefit is different than spending 40% of the money;
2) An electric car is still a car, and;
3) Medium/heavy-duty commercial vehicles have a far greater impact on EJ communities.

We commend PennDOT for developing a set of EV equity principles[1] for EV charging networks. To our knowledge, they are the only state DOT to have done so. While they offer a lot of quality guidance, we feel that we need to go further and beyond the single-occupancy vehicle.

Even in low-income, rural areas where driving is a de facto necessity, simply providing more SOV EV infrastructure will not ensure that low-income communities will derive the benefit of the investment. A new car of any kind is out of the reach of most Americans and an EV even more so. Further, where many of our low-income minority and vulnerable neighbors are, they are impacted by worse sources. Further, the environmental impacts have already created public health crises in these EJ communities. As the Natural Resources Defense Council (NRDC) states:

Although less than 10% of vehicles on the road, trucks pump out the majority of hazardous air pollutants and nearly 25% of the transportation sector's greenhouse gases. This is an urgent public health crisis across the country, particularly for communities near highways, warehouses, and ports. It is the poorest and most underserved among us who bear a disproportionate share of truck pollution and the resultant health impacts, including asthma, cancer, and premature death.[2]

The use of gasoline and diesel-powered medium/heavy duty (M/HD) vehicles disproportionately affects low-income and BIPOC communities in some of the following ways:

- Black people are 75% more likely to reside near commercial and manufacturing areas that produce higher levels of pollution.[3]
- Diesel pollution from fleets (i.e., public transportation, school buses, delivery trucks) creates higher levels of particulate pollution than gasoline-powered vehicles. This kind of pollution is substantially more harmful to health and is more concentrated in urban areas and communities with majority low-income and BIPOC residents.[4]

As shown in Figure 2 below, there is an exposure disparity of particulate pollution that comes from all different sectors, including medium-to-heavy duty vehicles. The x-axis shows the percentage of disparity each demographic experiences, with red bars showing higher comparative levels of exposure. The y-axis shows the percentage of total exposure that a source contributes to each demographic. The higher up

1 https://www.penndot.pa.gov/ProjectAndPrograms/Planning/Documents/EV%20Equity%20Principles_02072022.pdf

2 https://www.nrdc.org/experts/patricio-portillo/epa-its-time-act-we-need-clean-trucks-now

3 Palmer, N. (2021). Access to Electric Vehicles Is an Environmental Justice Issue. Scientific American, https://www.scientificamerican.com/article/access-to-electric-vehicles-is-an-environmental-justice-issue/.

4 King, P. (2021). Why Equity Must Be Central to Transportation Electrification. CleanEnergy.org, https://cleanenergy.org/blog/equity-in-et/.

on the y-axis a source is, the more relative exposure. POC are exposed to much higher rates of particulate pollution, from almost all sectors, when compared to white people. The highlighted sections show the direct and indirect impacts of M/HD vehicles.[5] It is important to note that "the disparities were seen nationally, as well as at the state level, across income levels and across the urban-rural divide."[6]

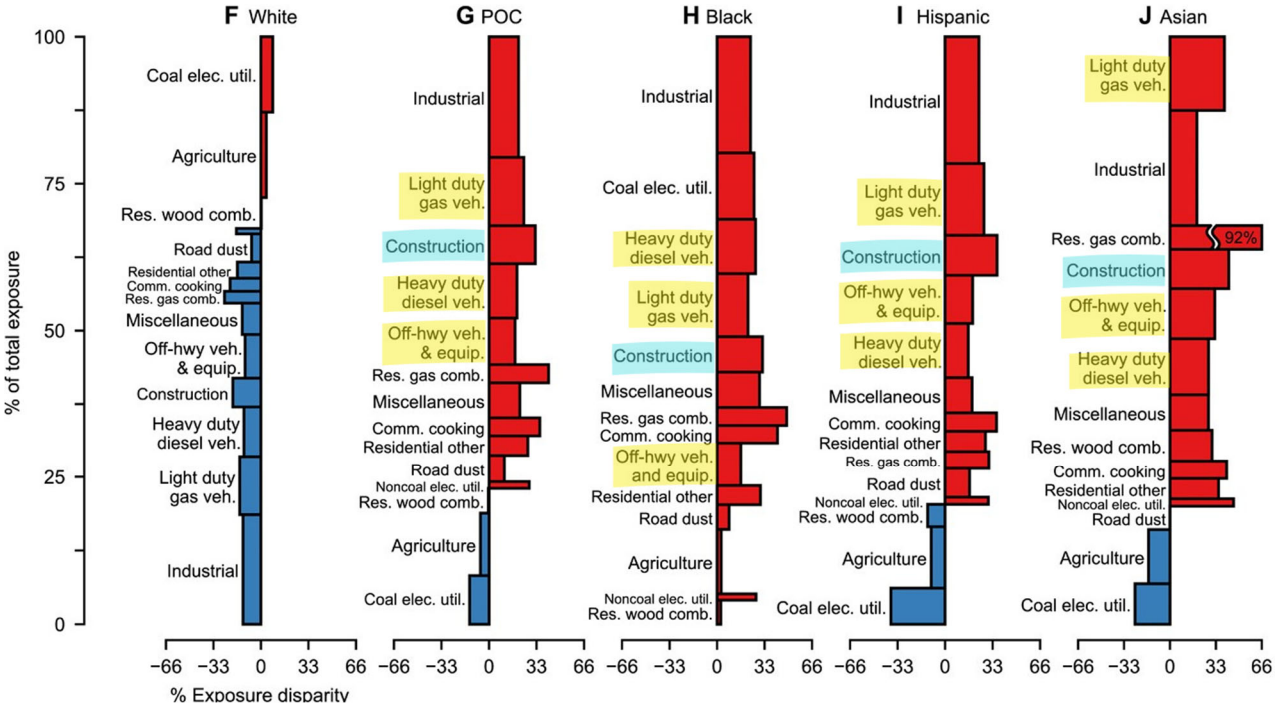

Figure 2. Exposure disparity by race, transportation sources highlighted in green.

Mobilify's attached Medium/Heavy-Duty EV policy memo goes into more detail on the impacts of these vehicles on LMI, BIPOC, and EJ communities. For us, the clear message is that any electrification efforts centered on equity must first clean up the air in our communities disproportionately suffering from transportation's impacts. This means putting commercial vehicle and fleet electrification on par with personal private vehicles.

DEP's Driving PA Forward program recently issued an RFI for a Medium and Heavy-Duty Zero Emission Vehicle Pilot Grant Program[7]. The proposed outcomes of the Program include improving air quality as a result of lowered vehicle emissions; improving air quality in one or more environmental justice areas;

[5] Tessum, C., Paolella, D., Chambliss, S., Apte, J., Hill, J., & Marshall, J. (2021). PM2.5 polluters disproportionately and systemically affect people of color in the United States. Science, DOI: 10.1126/sciadv.abf4491.
[6] Tabuchi, H., & Popovich, N. (2021). People of Color Breathe More Hazardous Air. The Sources Are Everywhere. The New York Times, https://www.nytimes.com/2021/04/28/climate/air-pollution-minorities.html.
[7] https://www.pacodeandbulletin.gov/Display/pabull?file=/secure/pabulletin/data/vol52/52-9/324.html

benefitting the electric vehicle supply chain in this Commonwealth; providing fleet managers with ZEV performance data; and increasing MHD ZEV purchases in this Commonwealth. This could be a great EJ electrification opportunity that we fully support, and hope DEP will deploy.

The traditional transportation community engagement practices are not enough

Historically, transportation project public engagement has followed a different trajectory than other sectors. In community and economic development, public transportation, and ped/bike projects, for example, engagement starts early in the process as concepts are being formulated. For highway projects engagement tends to happen further along in the development process where the public's input has minimal impact on what actually gets built. We are encouraged by the intentionality so far given to PennDOT's NEVI plan development and hope that the Commonwealth can go further.

During public engagement about charging infrastructure buildout, PennDOT should prioritize listening to feedback from communities and local governments. There must be effective, two-way communication on the NEVI Plan. This dialogue can help counter misinformation regarding clean energy, which has the potential to harm public adoption and community buy-in. This means going beyond electronic-only means to hosting key public meetings and working with on-the-ground stakeholder organizations to reach populations most impacted but not often heard from.

To assist with this engagement, we suggest looking to other departments like DEP and enlisting regional transportation planning bodies – MPOs and RPOs – to engage communities and local governments in publicly-funded EV infrastructure planning. M/RPO engagement could also prove beneficial in better understanding needs from a data-driven perspective.

Finally, there should be a statewide public messaging campaign to encourage support of charging infrastructure buildout. Air pollution and health impacts could be the central themes of a messaging campaign as these messages resonate across the partisan divide. This would help combat public misinformation surrounding electric vehicles and charging infrastructure.

Install systems that ensure that EV's pay their way fairly and equitably.

Pennsylvania's Motor Vehicle Code[8] does provide for the collection of an "alternative fuels tax," which includes EVs. Collection, however, has largely been unenforceable due to the nature of existing charging infrastructure and, in many cases, a lack of recognition by sellers and buyers that they owe the tax. Before passing new laws which impose regressive, punitive flat fees for EV ownership, the Commonwealth should work to ensure that all publicly available charging infrastructure going forward can collect the data necessary to exact the tax on vehicle charging. While not a cure-all – unlike liquid or

8 https://www.legis.state.pa.us/cfdocs/legis/LI/consCheck.cfm?txtType=HTM&ttl=75&div=0&chpt=90#:~:text=(1)%20A%20State%20tax%20of,engine%20aircraft%20or%20aircraft%20engines.

gaseous fuels, many consumers can top off their cars at home – it would go a long way towards ensuring that EVs are paying their fair share and abiding by current statute.

Ultimately, however, we need a new way to pay for our transportation system. PA's current funding model has been deemed as unsustainable for nearly a decade now. The 2011 Transportation Funding Advisory Commission[9] and 2021 Transportation Revenue Options Commission[10] both noted that our overreliance on liquid fuels taxes has been paying reducing returns for a long time. The coming EV revolution stands to torpedo funding even further.

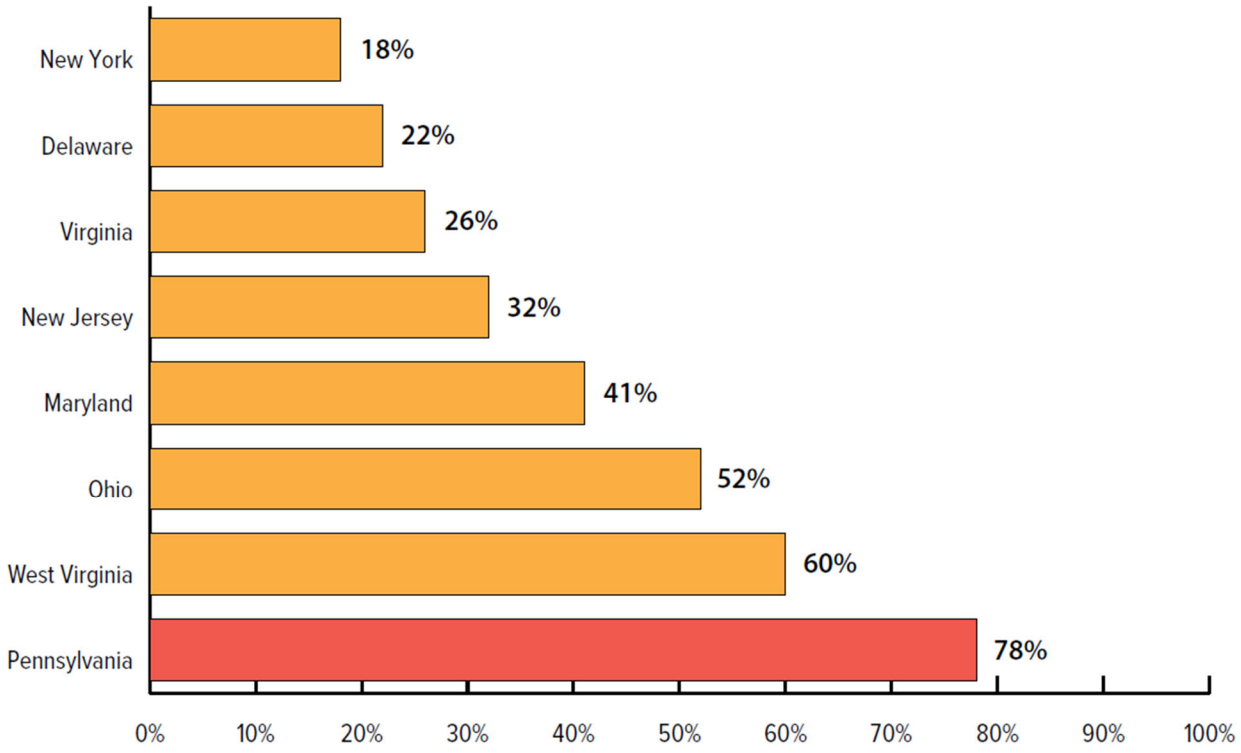

Figure 3. Gas Tax as a Percentage of Total Transportation Revenue, by State[11]

A key recommendation of TROC, and one the industry is increasingly exploring, is a mileage-based user fee or MBUF. The Eastern Transportation Coalition's MBUF pilot has shown that such a model could

[9] https://www.penndot.pa.gov/about-us/Documents/TFAC%20Executive%20Summary.pdf

[10] https://www.penndot.pa.gov/about-us/funding/Pages/TROC.aspx#:~:text=%E2%80%8BTransportation%20Revenue%20Options%20Commission,for%20Pennsylvania's%20vast%20transportation%20network.

[11] Transportation Revenue Options Commission Final Report, Pg. 17

adequately fund our transportation system and be more equitable for lower-income and rural drivers than the current liquid fuels tax. Mobilify supports further assessment of MBUFs, and the Committee can learn more about the pilots' findings at tetcoalitionmbuf.org.

We cannot combat the climate crisis by continuing SOV-fixated funding policies.

An electric car is still a car. In addition to cost considerations, we will not achieve anything close to zero-emission transportation by 2030 – or 40 – regardless of whether or not all cars for sale in 2030 are electric[12],[13]. ICE vehicles will be with us for some time, especially for low-income individuals. Further, when it costs the average Pennsylvanians roughly $9,500/vehicle to own and operate a car, we are exacerbating poverty through our auto-centric transportation policies.

We appreciate that PennDOT faces more daunting task than most state DOTs and agree that a healthy transportation system is vital to our competitiveness and quality of life. But it is also not in our economic or environmental interest to continue business-as-usual for the use of the scarce transportation funds we already have, let alone any new funds paid for by PA drivers, residents, and businesses.

We can no longer propose projects in a vacuum without considering their effects on the planet. Transportation policy is climate policy; nearly a quarter of PA's greenhouse gas emissions come from this sector. A responsible *spending* plan, taking that into account, must accompany any *revenue* plan. This involves reassessing current *and* future projects via several key questions:

1. How will current and future projects affect vehicle GHG emissions and VMT growth?
2. What share of funding will go to new/expanded roads, including "non-capacity-adding" projects like turn lanes and slip ramps?
3. What fiscal, EJ, and environmental cost/benefit metrics are used to evaluate whether particular road projects (construction or maintenance) are warranted?
4. How is the Department helping take cars off the road by including transit, pedestrian, and bicycling infrastructure in repair and replacement projects?
5. How are we stabilizing and growing transit operations and maintenance funding?

We feel that these are the questions we should be asking ourselves if we are to be serious about carbon reduction, air quality improvement, and environmental and economic justice finally being achieved within our transportation systems.

Conclusion

EV infrastructure needs to be a top transportation priority in Pennsylvania, but we must ensure that its benefits also reverse many of the environmental injustices our most vulnerable neighbors face. We also must recognize that, to achieve our climate goals, other modes like public transit and walking and biking

[12] https://ssti.us/2021/09/13/the-amount-we-drive-could-make-or-break-clean-energy-plans/
[13] https://usa.streetsblog.org/2021/06/18/electric-vehicles-wont-save-us/

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must be more robust throughout the Commonwealth. Pennsylvania has a robust community of advocates, OEMs, utilities, program administrators, and communities who are eager to ramp up for this coming reality, and it should be tapped for advisement and deployment of infrastructure.

I hope this is the beginning of many more discussions on these issues. I thank you for your time and look forward to your questions.

Sincerely,

Chris Sandvig, Executive Director

INTRODUCTION

The vehicle electrification movement is rapidly accelerating as automakers worldwide commit to all-EV production as soon as 2030. Historically, most advocacy and effort has been focused on single-occupancy vehicles (SOVs). While this global shift is welcome and necessary to address the climate crisis and urban air quality issues, benefits of private vehicle electrification in the near-term will bring minimal benefit to LMI and BIPOC communities, which disproportionately suffer the immediate and long-term consequences of exposure to toxins related to fossil fuel emissions. Issues of affordability, supply-and-demand shortages, and the longevity of gasoline powered cars will all contribute to a slower adoption of SOV EVs. In fact, a recent study shows that single-occupancy EVs could make up one-quarter of the new car sales by 2035, but only 13 percent of vehicles on the road would be electric.[1] This is because the life of a standard gasoline-powered SOV is at least a decade, if not more. Therefore, to be equitable, we must focus on immediate public health relief from other sources while meeting our climate goals.

Alongside more robust support for transit and active mobility, refocusing our collective energies on medium-to-heavy duty (M/HD) vehicle electrification is one of the strongest ways to bring environmental and social justice to the transportation decarbonization movement. M/HD vehicles' carbon footprints and air quality impacts are disproportionately higher than those of SOVs. Their operations and storage are often located within LMI and BIPOC communities, concentrating their impacts on our most vulnerable neighbors. However, with the right interventions, M/HD electrification has the potential to be widely adopted more quickly, with more immediate effect than SOV electrification.

There are a number of state policies and federal initiatives working to increase the fleets of M/HD EVs and provide the necessary infrastructure to support them. The economic cost of EVs is also rapidly changing, as batteries become less expensive, gas prices continue to rise, and financial incentive programs offset many upfront costs.

Still, there are many challenges in the transition away from gasoline and diesel-powered vehicles. There is concern that massive electrification of fleets will upset an already overloaded electrical grid. Additionally, charging stations would need to be readily accessible and available equally, not just in wealthy, majority-white areas. And there is significant conservative opposition to legislation promoting clean energy and electric vehicles.

As such, it is recommended that: states and businesses implement financial incentive programs; a portion of both federal and state infrastructure funding is allocated specifically to majority-minority and low-income communities; and states enact legislation that would make benchmark requirements towards the electrification of fleets.

Mobilify and stakeholders can support these efforts by engaging with communities early in the planning process, to get their input and feedback, as well as connect them with utility providers and legislators to make their voices heard. Interested parties should also advocate for regulations and legislation in Pennsylvania, similar to California's Advanced Clean Trucks rule,

[1] Plumer, B., Popovich, N., and Migliozi, B. (2021). "Electric Cars are Coming. How Long Until They Rule the Road?" The New York Times, https://www.nytimes.com/interactive/2021/03/10/climate/electric-vehicle-fleet-turnover.html

Heavy-Duty Omnibus rule, and Advanced Clean Fleets rule. On the other hand, it is just as important to oppose and petition against harmful legislation that would set back fleet electrification.

SOCIAL EQUITY IMPACT OF M/HD VEHICLES

Medium-to-heavy use vehicles are large units, used to transport large groups of people, goods, construction materials, refuse, and more. They can weigh anywhere between 14,001 to over 60,000 pounds each and are divided into 8 classes, which is shown in the figure below.

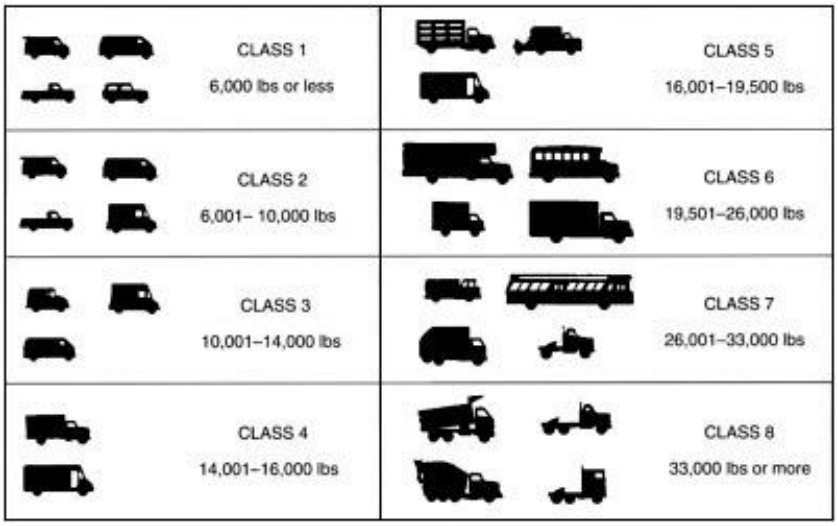

Figure 1. Medium-Heavy Duty Classification System [3]

The use of gasoline and diesel-powered M/HD vehicles disproportionately affects low-income and BIPOC communities in some of the following ways:

- Black people are 75% more likely to reside near commercial and manufacturing areas that produce higher levels of pollution.[2]
- Diesel pollution from fleets (i.e., public transportation, school buses, delivery trucks) creates higher levels of particulate pollution than gasoline-powered vehicles. This kind of pollution is substantially more harmful to health and is more concentrated in urban areas and communities with majority low-income and BIPOC residents.[3]

As shown in Figure 2, below, there is an exposure disparity of particulate pollution that comes from all different sectors, including medium-to-heavy duty vehicles. The x-axis shows the percentage of disparity each demographic experiences, with red bars showing higher comparative levels of exposure. The y-axis shows the percentage of total exposure that a source contributes to each demographic. The higher up on the y-axis a source is, the more

[2] Palmer, N. (2021). Access to Electric Vehicles Is an Environmental Justice Issue. Scientific American, https://www.scientificamerican.com/article/access-to-electric-vehicles-is-an-environmental-justice-issue/.
[3] King, P. (2021). Why Equity Must Be Central to Transportation Electrification. CleanEnergy.org, https://cleanenergy.org/blog/equity-in-et/.

relative exposure. POC are exposed to much higher rates of particulate pollution, from almost all sectors, when compared to white people. The highlighted sections show the direct and indirect impacts of M/HD vehicles.[4] It is important to note that "the disparities were seen nationally, as well as at the state level, across income levels and across the urban-rural divide."[5]

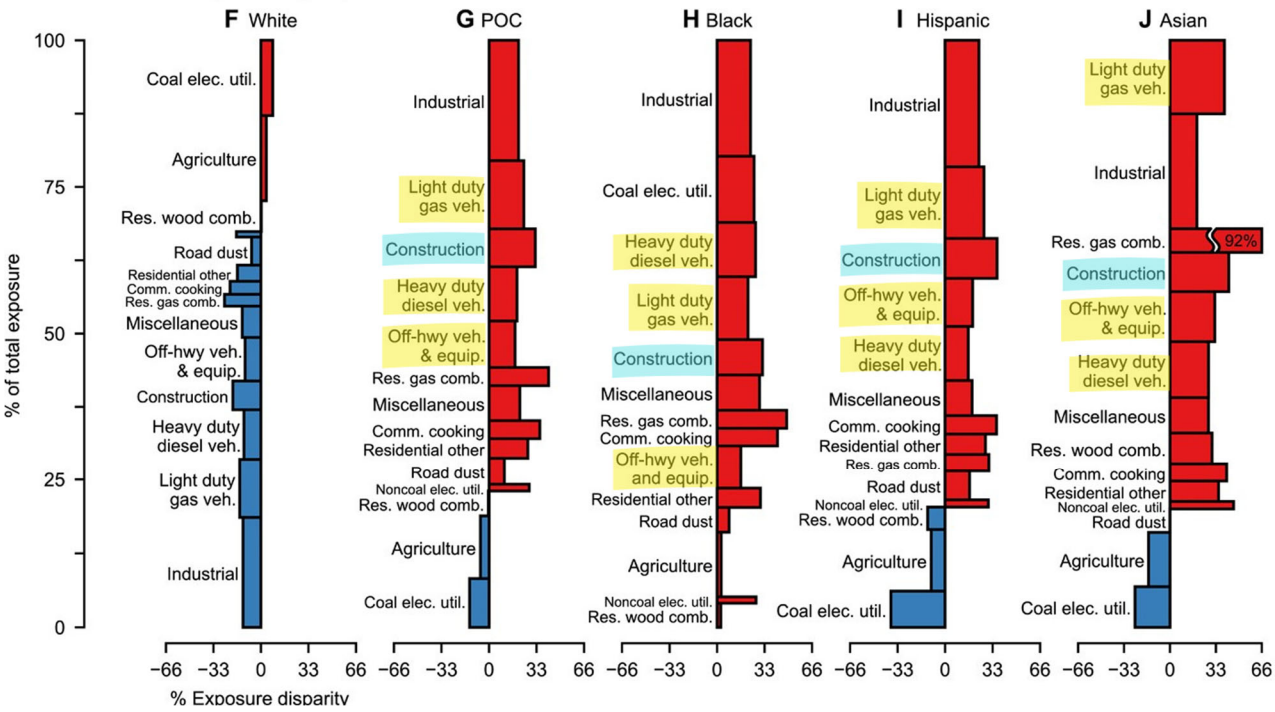

Figure 2. Exposure disparity by race, transportation sources highlighted in green.

Given their disproportionate impact of pollution and emissions on POC individuals, M/HD vehicle electrification strategies take equity into account. Charging stations for M/HD EV infrastructure must be present in all communities and roadways equally, so long-haul truck drivers have access to recharge their vehicles at any point in their trips. Without charging access, it is more likely for diesel powered fleets to continue running through communities of color and low-income areas. Additionally, charging infrastructure installation and operation entities must be engaged with the populations they serve, to receive feedback and build rapport. The populations who are disproportionately affected by the harms of fossil-fuel powered transportation must be included in every conversation and policy decision.

There are some measures already in place that could be widely adopted by states. The Biden administration has committed to investing in 500,000 charging stations and 40% of overall clean energy benefits in disadvantages communities as part of its Justice40 initiative. California and

[4] Tessum, C., Paolella, D., Chambliss, S., Apte, J., Hill, J., & Marshall, J. (2021). PM2.5 polluters disproportionately and systemically affect people of color in the United States. Science, DOI: 10.1126/sciadv.abf4491.
[5] Tabuchi, H., & Popovich, N. (2021). People of Color Breathe More Hazardous Air. The Sources Are Everywhere. The New York Times, https://www.nytimes.com/2021/04/28/climate/air-pollution-minorities.html.

New York have created laws and regulations that require a specific portion of EV charging funding to be designated for disadvantaged communities. These types of regulations ensure that communities of color and low-income areas will not be overlooked or left out of policies. Without these policies, "you could see a big round of ratepayer-funded charging investments going disproportionately to communities that least need the support."[6]

CHALLENGES

There are several challenges toward M/HD electrification.

one of the barriers that has remained is the lack of charging infrastructure. Given the variety of M/HD vehicle types, different classes will require different charging stations. Larger trucking companies have started to build in-house charging stations, for trucks to recharge while docked. However, this is often too costly for smaller fleets without the necessary funds, and it doesn't account for the need to recharge while on the road. There must be readily accessible charging stations, including Level 2 chargers (which are slower and better suited for Classes 2-3) and Direct Current fast chargers (which have faster recharge rates, higher cost, and are better suited for long distance hauls). There is also concern over how prepared utility providers are for the massive influx of EVs on the electrical grid.

Another challenge will be persuading industry leaders, who are often resistant to change, to support fleet electrification. For instance, the US Postal Service recently dealt a huge blow to the fleet electrification movement. The agency is well suited for electrification because of the size of their trucks, large amount of downtime overnight, and relatively low rate of miles traveled each day. Nevertheless, the agency has committed to a multi-billion contract to replace their current fleet, of which 90% of new vehicles will be gas-powered. The Postmaster General insists that EVs are too expensive, and that charging infrastructure is not available. Decisions of this magnitude will have negative implications for decades since diesel-powered trucks often stay on the road upwards of 500,000 to 800,000 miles.[7]

ACTION POINTS FOR STAKEHOLDERS

There are tangible actions that stakeholders can take to support M/HD electrification.

1. Advocate for legislation in PA that would set benchmarks for reducing emissions and investing in clean energy transportation fleets.

[6] Somberg, B. (2021). Study: Few States and Utilities Ensure Equity in Electric Vehicle Charging Investments. American Council for an Energy-Efficient Economy, https://www.aceee.org/press-release/2021/04/study-few-states-and-utilities-ensure-equity-electric-vehicle-charging.
[7] Keaton, S. (2021). How Long Do Diesel Trucks Last? MotorBiscuit, https://www.motorbiscuit.com/how-long-do-diesel-trucks-last/

2. Support existing working groups and create new collaboratives to discuss M/HD electrification, under the framework of social equity impact.
3. Monitor opposition movements and prepare to lead campaigns against harmful legislation.

These are the policies that address M/HD electrification which stakeholders should be aware of.

Federal:

- *Infrastructure Investment and Jobs Act (IIJA):* This plan allocates $7.5 billion for construction, maintenance, and operation of a network of charging stations across the country. It requires private and public partnerships to create the infrastructure. Funding will be disbursed to states through competitive grants and formula allocation. The legislation also provides $5 billion to the Clean School Bus Program, $250 million for the Electric Ferry Pilot Program, $250 million for the Reducing Truck Emissions at Ports Program. All of these programs are geared toward EVs and creating the technology needed to support them.

State:

*Currently at the state level, only California has formally enacted policies addressing this issue. New Jersey and New York are considering adopting policies like the ones in California. Pennsylvania has signed onto a Memorandum of Understanding with 14 other states and the District of Columbia regarding M/HD vehicles.[8] The participating states have agreed that all new M/HD vehicles must be zero emission by 2050.

- *Advanced Clean Trucks:* Speeds up the transition to zero-emission M/HD EVs by enacting a manufacturer sales requirement and a reporting requirement. The sales portion would require certain manufacturers to sell zero-emission trucks in an increasing percentage until 2035. Large fleet owners (with 50 or more trucks) would be required to report information on their vehicles, in order to develop strategies to purchase zero-emission trucks and add them to suitable routes.
- *Heavy-Duty Omnibus rule:* Creates stringent nitrogen oxide and particulate matter emission standards for all new fossil fuel trucks in the state beginning in 2024. The standards will decrease NOx pollution by 75% in new trucks, which many manufacturers have already begun producing. Companies that follow the new standards before the rule comes into effect will receive early-action credits and incentives.
- *Advanced Clean Fleets rule*: Requires California public fleets to purchase exclusively zero-emission trucks by 2027. This is similar to the Advanced Clean Trucks Act, except this rule is targeted for public fleets rather than private manufacturers.

[8] Young, S. and Miller, P. (2020). 15 states and the District of Columbia join forces to accelerate bus and truck electrification. California Air Resources Board, https://ww2.arb.ca.gov/news/15-states-and-district-columbia-join-forces-accelerate-bus-and-truck-electrification

Ignatius Fletcher Jr. June 6, 2022

Electric Vehicles and their associated charging equipment are an emerging technology that is exciting, and interesting to consumers and drivers in the U.S., and around the world. People everywhere have stopped seeing the Internal Combustion Engine (ICE) as the only automobile on the market, and taken heavy interest in EVs. The electrical industry, most of all, has seen the benefits to come from EVs and their associated charging equipment. These benefits can include environmental aspects, reduction of oil and natural gas dependence, community impact, as well as job creation. All of these benefits come with the caveat of the equipment being installed safely, on time, and reliably. That is where the IBEW, and local 98 can help. We are prepared with a skilled and educated workforce that only the IBEW can produce.

My name is Ignatius Fletcher Jr. I am a 17 year member of IBEW Local Union 98. I am a 4th generation electrician, and I am currently an Instructor at ATEI, Local 98's Apprentice Training. I have been a full time day instructor for 6 years now, and over my years have been involved in many aspects of the electrical industry including; safety (OSHA), National Electrical Code (NEC), Life Safety Systems, and Emerging technologies. Emerging technology courses I teach to Apprentices and Journeyman alike include; Photovoltaics (Solar), Lighting Control Systems, Energy Storage and Micro grid Training and Certification (ESAMTC), as well as Electrical Vehicle Charging Systems (EVCS).

EVCS is a technology that the IBEW and NECA have been focused on for many years now. Electrical Vehicle Training Program (EVITP) is the first certification course for installing electrical vehicle equipment in the U.S. and was develop in 2011. My father, a retired member and Instructor, was involved with the development and adoption of that course's use in the IBEW when it was first started. IBEW and NECA partnered together to install the first EVCS in Montgomery County in 2011 at King of Prussia Plaza. While EVs and its charging equipment may be a "new" technology to many, it is something that we have been involved with for quite some time.

Local 98 members and apprentices can, and have, received training in the EVITP program to become certified installers. Our current apprentice curriculum includes the EVITP course in its 5 year apprenticeship program. The EVCS course includes lesson on:

1. Electric Vehicles
2. Electric Vehicle Charging Equipment
3. The NEC
4. Advanced Load Calculations
5. Site Assessment

6. Commissioning
7. Troubleshooting

At the completion of this 18 hour course the student must take an online certification exam, a 3rd party provided assessment from EVITP. This course and documentation provides our members with knowledge and skills related to charging products and associated equipment on the market today. Electrical Workers completing this training go to work with the ability to implement best practices in areas such as charging station equipment, infrastructure site assessment, load calculation, installation, commissioning, and troubleshooting.

The key to any electrical installation is to have a knowledgeable and experienced electrician working on and completing the project. Only a qualified person is able to complete these projects in a safe and timely manner, with the reliability that the equipment will work as intended. A qualified person as defined by NFPA 70, the National Electrical Code (NEC), is "one who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training to recognize and avoid the hazards involved." That definition describes all of our IBEW local 98 members. Our members go through a 5 year state accredited apprenticeship program which includes 1080 classroom hours and 8000 on the job training hours. Thorough out this program they receive OSHA 30 Training, NFPA 70e (Electrical Safety Training), and EVITP. I can't imagine anyone more "Qualified" for EVCS installations then our dedicated members.

The importance of skills and knowledge for EVCS installations is important on many levels. This includes understanding what types of EVCS charges and Plug Connectors there are in the EV industry. There are three levels of charging equipment currently:

Charger	**Charge time (0% - 100%)**
Level 1: 120 volt AC, 20 amp	8.5 – 10.5 hours
Level 2: 208 / 240 volt AC, 30 – 80 amp	5 – 8 hours
Level 3: 500 – 1000 Volt DC, 200 – 500 amp (DC Super Charger)	30 min

The level one EV charger is a charger that would commonly come with the purchase of an EV, and plug into a simple 20 amp receptacle outlet. The level 2 charger is an upgraded residential charger that can be purchased, and requires the installation of a 30 – 80 amp receptacle outlet. The DC super chargers are the high end, high power, chargers that can charge cars in approximately 30 minutes or less. These chargers are the chargers looked at to play a role as "electrical stations" similar to our current gas stations.

With all of the different technologies of charging equipment there comes a need for sufficient power to be available to deliver energy to multiple stations. Installing multiple Level 2 chargers commercial could require the installation of larger electrical power distribution equipment within a facility or building. DC super chargers will always require the installation of larger power distribution equipment, this due to the fact of the sheer amount of power needed to feed one, yet alone multiple stations. All commercial electrical vehicle charging equipment requires knowledge of multiple electrical

installations other than just EVCS. The type of knowledge and skills a state accredited Apprenticeship program that provides EVCS certification like IBEW local 98 provides it's members.

The plug connectors for EVs can be a complicated issue. Currently there is no federal standardization for EV plug connectors. The automotive industry as a whole has standardized the EV plug for level 1 and level 2 charging equipment to the J1772 plug. This has allowed for universal use of charging equipment between almost all makes and models of cars from different companies. However Tesla has decide to use their own proprietary plug. Level 3 charging equipment uses either a CHAdeMo plug connector or CCS. The CCS is simply a combination plug that allows for level 2 AC or 3 DC charging. The CCS plug ideally allows EV drivers to use any plug anywhere on any car, whether it be at a level 2 charger or a DC super charger. Tesla again however, has its own proprietary plug connector for its DC super charging equipment. The different plug connectors might seem like a minor issue, but it is in fact a very problematic one. As of 2020 the U.S. Department of Energy Alternative Fuels Data Center reported there are across the U.S.:

2,376 public stations with 3,461 CHAdeMO connectors

2,110 public stations with 4, 425 connectors

758 public stations with 7, 249 Tesla connectors

If you drive a non Tesla EV there are, as of 2020, 7,249 connectors that are incompatible with your vehicle. While this may seem like a minor nuisance to some this is something that can severely cripple the plans to build a national EVCS infrastructure, where people will have reliable charging options on every road.

Europe has required by law all electrical charging stations use either the J-1772 connector or the CCS combination connector. No others are allowed. Tesla in turn has adapted and changed all of their EV's inlets to match those standards, as well as, changing all of the connectors on their EVCS equipment. This in turn has eliminated their proprietary connectors in Europe and has allowed for a seamless EV charging experience for drivers. I strongly recommend the U.S., on the Federal level, consider the same requirements. While Tesla has more recently promised, and began to add CCS connectors to their stations, as well as their own proprietary connectors, this is solely their choice. They can always decide otherwise, or worse another EV manufacture could develop their own connector and muddy the waters even worse for our EVCS infrastructure.

Other Issues that the EV industry and government must consider are the problems with urban EV charging, and the U.S. power distribution systems and generation. Urban cities are often overcrowded, and a large majority of the homes in these cities lack driveways or space for residential EVCS. This requires the need of a very strategic plan of where to develop, and locate EVCS within cities such as Philadelphia. Without a well thought out plan for mapping public EVCS within the city, range anxiety and lack of infrastructure will continue to slow the EV market as a whole.

With the installation of 8-10 Level 2 EVCS comes the need for approximately 500-800 amps (150 kW) of power. With the installation of 10 DC super charger comes the need for approximately 2000 – 4000 amps (850 kW) of power. Now multiple that amount of power by hundreds of these installations across Pennsylvania and the entire U.S. Can are current electrical distribution lines from the utilities handle that? The answer is likely no. Many of the utility lines are not sized for that type of power

demand, and many others are damaged or outdated. With money allocated for EVCS we also need to attend to a long overdue problem of reinforcing and rebuild our nation's electrical distribution infrastructure.

With a well thought out plan to help the electrical distribution system across the nation, also arises another question and issue. Where and how are we going to generate all this power needed to charge EVs? That's were other emerging technologies in the electrical industry can help. Photovoltaics or solar has come to a point where it can be a viable supplement to the utility's power generation. Micro grids applications are a feasible way to supplement and generate power. Micro grids of all shapes and sizes can help with future power generation issues. If companies were incentivized to build their own micro grid and solar systems, it would help taken the burden of power generation solely off the hand of the power Utility's.

This concept has been adopted by IBEW local 98 as we invest into a new apprentice training facility at our 98 north location in Montgomery County, PA. We are currently in the process developing a new apprentice training facility that would incorporate Photovoltaics, Wind, Hydro, battery storage and create our own micro grid to power our building and EVCS equipment. This being a way to usher in the emerging technologies of the future and allowing the community to feel our impact through public charging stations, utility pricing stabilization, and environmental benefits.

While there are many hurdles and questions to overcome with building an EVCS infrastructure, we at local 98 believe that the U.S. will benefit largely from this transition to electrical vehicles. The issues in front of us are far outweighed by the benefits of EVs and other emerging technologies. The environmental impact will help the generations that come after us. The reduction of oil dependency will benefit people now and in the future and the jobs that are created for qualified electricians, other trades, and all people will have a lasting effect.

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